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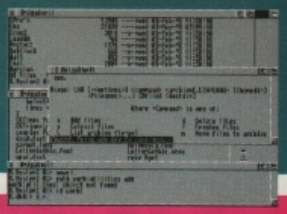
WITH CU AMIGA

PART THREE ● JANUARY 1993



AMIGADOS P8

AMIGA Guide

THE **COMPLETE** GUIDE TO THE AMIGA

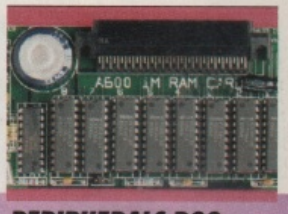
FOR BEGINNERS

THE DEFINITIVE GUIDE FOR NEW OWNERS

WORKBENCH P14

GRAPHICS P16

SOUND P20



PERIPHERALS P22

THE AMIGA TOTALLY COVERED AND EXPLAINED IN SIMPLE TERMS

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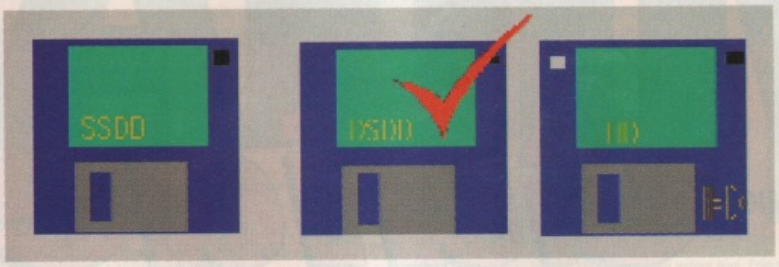
FREE! EXCLUSIVE TO CU AMIGA MAGAZINE!
PART THREE OF THE MOST COMPREHENSIVE GUIDE TO THE AMIGA EVER PUBLISHED.

BEGINNER'S GUIDE



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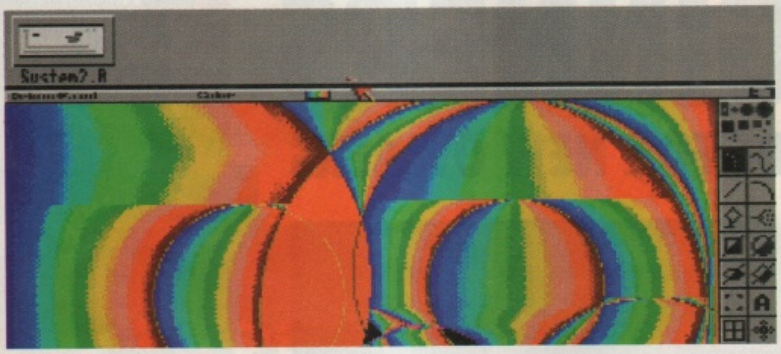

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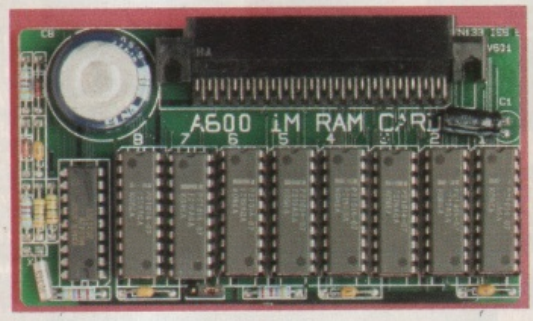

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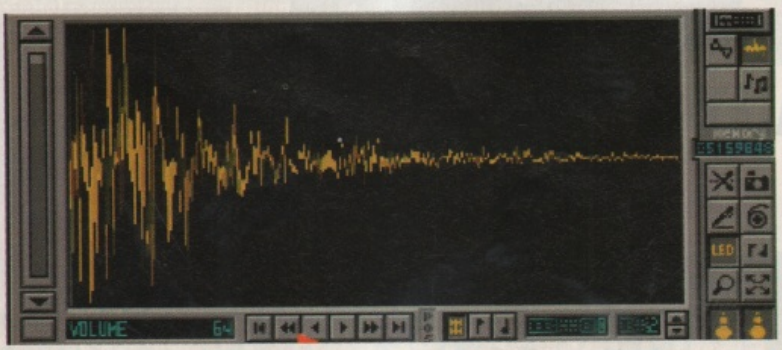

Sounds good...

The story so far: you have recently acquired a very nice new machine with the word Amiga on it. Unfortunately you don't really have a clue about what's really going on. In desperation you find yourself reading CU's Amiga Guide in an attempt to get some answers. Now read on...

EDITORIAL

Welcome to the third Amiga Guide, free with the January issue of CU Amiga. Over the coming months, Amiga Guide will cover every aspect of the Amiga, from programming, graphics and animation to music, video and desktop publishing. Each free magazine will cover a distinct topic, building up into one of the most complete guides to the Amiga ever published.

Last month we took a look at games. This month we go back a few steps for the benefit of all the new readers out there who have just acquired an Amiga and are puzzling out exactly what to do with it. We will be looking at your first steps with your new machine , explaining most of the jargon and hopefuly helping you to get the most out of your Amiga as quickly as possible.

The capabilities of the machine and how to harness them will be explained in simple terms throughout and even if you get a tad confused there is a handy glossary at the back of the issue to help you out.

Common problems will be dealt with in the amazingly cunning Q&A section, where we anticipate those early setbacks and try and get you on course again as fast as possible.

Finally there are respective sections detailing the various fields of interest in the Amiga. Be sure to read them or you may miss out on some of the amazing things your brand new computer can do.

Whatever your level of experience with computers we hope you will learn something from this guide and stick with us in future issues as we explore the far horizons of the Amiga experience.

It's hoped that you'll enjoy these guides and get a lot out of them. Initial reaction to the first two guides has been incredibly favourable, but if you've any suggestions to make things even better, then please drop me a line at the editorial address.

Nick Veitch, Editor.

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Your new machine, what it does and how it does it. As the first part of our tour of the Amiga we look at the heart of the machine and the chips which make it the greatest home computer ever.

6 EXPANSION PORTS
What are all those funny sockets at the back the Amiga for and are they of any use? We explain the expansion ports – what they do and what is usually connected to them.

8 AMIGA DOS
The user interface and the CLI are probably the most difficult things to understand when you first use an Amiga. With a little practise, however, it soon becomes second nature. Here we give you a little push start...

12 DISKS
Virtually all the data and programs you are ever going to use will at some time be stored on a floppy disk. You may not need to know exactly how they work but you do need to take care of them, as this section explains.

14 WORKBENCH
The Amiga allows its owner to change just about every aspect of the environment in which he or she will be working. Knowing the way preferences work is vital to stamping your individuality on your machine.

16 GRAPHICS
How do graphics on the Amiga work? Here, with the help of a few examples we show you just what is possible on the brightest home computer around.

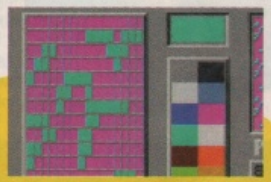
20 SOUND
The sound capabilities of the Amiga are the same as they ever were, but Paula's not ready to be put out to pasture yet.

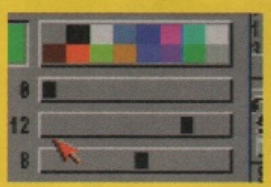
22 PERIPHERALS
It won't be long before you feel the need to expand. Before you start making deals with Russia and annexing the Sudettenland, swot up on all the gizmos and goodies which can help the Amiga help you to become master of the universe.

26 QUESTIONS AND ANSWERS
Everyone has some teething problems with their Amiga, so the aim of this section is to help sort them out straight away – because believe me we know how frustrating it is.

28 CLUBS
New users can often benefit quite a bit if they join a local club of like-minded users. With a selection of clubs culled from our regular column in CU, this could be just what you are looking for.

30 GLOSSARY
A handy guide to all those funny bits of gibberish that seem to permeate every aspect of Amiga literature. The manual suggests you may have overloaded the byte count SCSI vector overlay adjustor with a consequent breakdown in Chip RAM yorkie capability? Check it out here.





Yes, but what is it?

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WELCOME TO THE AMIGA

By buying an Amiga you have automatically entered an exclusive club. It's a club bound together through the use and enjoyment of a rather wonderful home computer. The Amiga is an attitude, a way of life, a small piece of plastic with lots of bits of electronics inside.

Whichever model you actually own, you will soon realise that the Amiga is part of a wide family. Although you may have had another home computer of which there were several different versions, your Amiga is part of an entire range of home computers which all share the same design philosophy. From the small but powerful A600, through the enhanced abilities of the A1200 to the flagship of the range, one of the most powerful home computers yet developed, the A4000, they all operate in a similar environment and to a great extent can all run the same software.

The A1500 and above have been biased more towards productive use by the inclusion of a Zorro card. This is an extension port attached inside the machine, so extra cards can be purchased and installed. A large number of cards are available for all sorts of purposes - modems, accelerators, hard-drives, video equipment - virtually everything you could possibly want to connect to a computer (and a few things you probably wouldn't) are produced to the Zorro standard.

The Chips

The reason that Amigas are so special is largely due to the custom chips. Instead of having the processor do all the work, as with conventional machines, the Amiga has certain tasks which are handled exclusively by custom processors. In effect you really have three computers in one. In the A600 the custom chips are slight enhancements of those found in the original A500.

Paula

Paula is the sound chip. We will be learning more about sound in a later part of this supplement, but to begin with perhaps we'd better explain how sound is generated on the Amiga. Instead of using a waveform generator and modulating the output, as machines like the Spectrum, Commodore 64 and Atari ST do, the Amiga deals directly with digital samples.

This does mean that the sounds take up more room, but it also allows a greater degree of fidelity. Paula can handle four channels of 8-bit digital sound at speeds of up to 44kHz. This is about the same sample rate as a CD, but because we are only dealing with 8-bit samples the quality is about half that of a CD. It's still pretty good as I'm sure you'll find out.

Paula is the oldest chip on the Amiga, and hasn't changed since the original A1000 back in the mid-eighties. It is due for an overhaul soon, but it still matches the sound performance of any other similarly priced home computer.

Agnus

Agnus has changed several times since the first Amiga. This is the chip which acts as a giant terminus for all the other custom chips. Because they have to share memory using DMA (Direct Memory Access) channels, there needs to be something to tell them whose turn it is and where to look. The Agnus chip controls what is known as the Chip RAM, the memory which is directly accessible by the other custom chips. Various versions of Agnus allow different amounts of memory to be accessed. The latest version allows the chips to access up to 2Mb of memory, more than enough for home use.

The Agnus chip is also home to the Copper. The Copper is a graphics co-processor which can be programmed to alter the colour palette and the screen resolution at any point in the screen's display cycle. It is the copper which makes possible those graduated screen effects and, more usefully, the ability to drag different Amiga screens so that more than one is displayed at any time. As well as these duties, the Agnus also contains the blitter, a really fast piece of circuitry which is designed to do one thing only – move memory. The amazing speed with which the blitter can manipulate memory makes many graphics effects possible which are belied by the relatively slow processor speed of the 68000.

Denise

The Denise chip is the one which controls the graphics display modes. It doesn't do anything exceptionally clever, but being able to generate all those different screen modes is clever enough. The A600 is equipped with an ECS (Enhanced Chip Set) Denise, which allows more screen modes (such as super high-res and productivity) and also has extra functions which add flexibility to any genlocking activities you may get up to.

INTRO INTRO

The A1200, the best value Amiga at the moment.

So what good are all these chips?

Well, for a start they enable the Amiga to be a very effective and relatively cheap games machine. That is in fact what the Amiga was designed for in the first place. Jay Minor and the other fathers of the Amiga were actually working on a games machine for Atari until they ran into financial trouble and Commodore bought up the whole project.

Being a decent games machine also means that the Amiga is capable of some pretty advanced professional work. In order to be a good games machine the hardware has to be a lot better in terms of speed, sound and graphics than if it were just designed to be a word processor.

Having excellent graphics makes it incredibly useful as a tool for designing artwork, animations, desktop publishing, and of course video work. The Amiga is already used professionally by many small video companies. Even some TV operations use Amigas to generate titles and effects. Some of the software and hardware available to the Amiga desktop video enthusiast is unrivalled by any other personal computer.

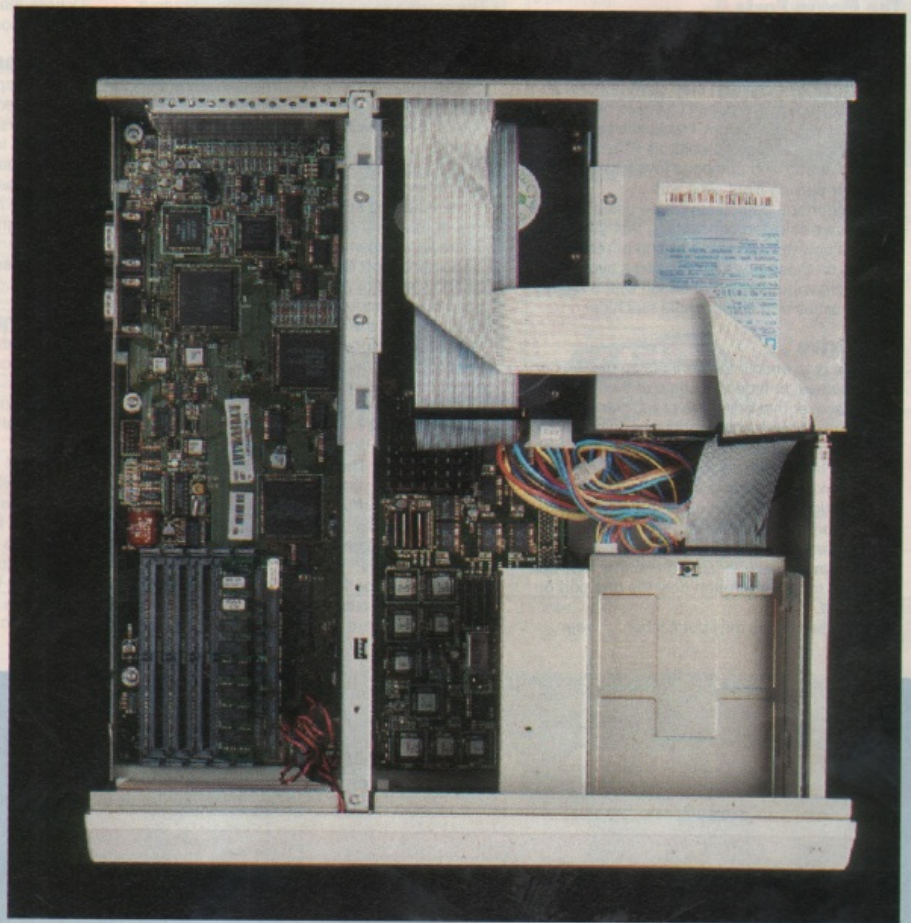
The sound capabilities aren't quite up to CD standards, but the Amiga can still form part of a useful studio with the simple addition of a MIDI port. The software available for the Amiga is impressive in this area too. So impressive in fact that an Amiga running *KCS3.57* was used by Madonna whilst recording an album.

The Amiga has the most advanced operating system of any home computer too, because it multitasks. This means that it can carry out two entirely separate operations at once. This is not the same as task switching, which is possible on the Mac and PC, because in their case only one task can be active. On the Amiga more than one process can be active at a time. So what? Well, it means you can use a wordprocessor (like I am doing now) and process graphics (like I am doing now) at the same time (like I am doing now). The computer intelligently uses the time it would otherwise spend waiting in one task to carry on with the others.

It doesn't matter if all you want to do is play games, fiddle about with *DPaint* and maybe compose a few demo tunes – the point is that the Amiga

THE PROCESSOR

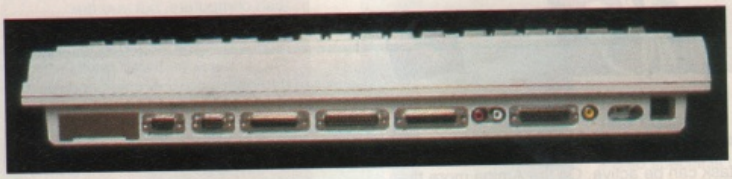
The standard processor for the Amiga, as fitted to the A600, is the Motorola 68000. Clocked at a speed of 7.14 MHz, this is a bit pedestrian by the standards of other computers.The Amiga's processor is its brain. It does all the calculations and executes all the programs, passing on instructions to the custom chips when necessary. The Motorola 68k series is also used by Apple in their macintosh computers, but you are unlikely to find a Mac that uses anything less than a 68030 chip. This is because these machines don't have custom chips and rely on the processor to do all the work, including graphics and sound. Even then most are unable to keep up with the blistering pace of the Amiga.The new Amiga 1200 uses a 68020 chip, which not only executes instructions about four times faster than the 68000, but also allows the addition of a maths co-processor. A co-processor is a custom chip designed to speed up floating point calculations (hence it is known as a floating point unit or FPU).



The insides of the Amiga 4000, now the flagship of the Amiga range. This is far from being just a home computer – yet it will still run almost all of the software developed for its lesser brothers.

EXPANSION PORTS

There is an awful lot going on at the back of your Amiga. It is a machine that likes to connect to the world outside. Here is a brief guide to what the ports are for, and what you would most likely find hanging off the back of them.



It isn't enough that you've got a computer, they all have an inbuilt obligation to buy lots more devices to keep them company. The main method of affixing things to your computer is not superglue, but the interface ports to be found along the rear of your keyboard unit.

The Mouse Ports

These are standard 9-pin connectors which you can use to connect a variety of input devices to your Amiga. Okay, so most people stick their Terminator joysticks and their Commodore mouse in here, but it doesn't have to be that way. The ports will also accept Trackballs (a kind of inverted mouse), paddle controls (if you can still find any about) and analogue joysticks, all the better for playing flight sims with.

It is important, particularly when using devices which have shielded connectors, that you disconnect the power when trying to add or remove devices on these ports. It only takes two of the pins to cross out for you to be left with a nasty burning smell and an unusable machine.

Disk Drive

This port is to enable the connection of an external disk drive, or indeed a chain of them. You will soon discover that being the proud owner of a mono-drive Amiga is not conducive to remaining out of the sanitarium. AmigaDOS seems to work a whole lot better with two drives (because you can keep Workbench permanently in one of them).

The Amiga can handle up to three drive units in total, so on a A600 or A1200 this means that you can add an extra two at the back. These drives usually have a daisy-chain port so that they can be linked together through only the one port on the Amiga.

Having two drives may put a strain on your Power supply though. Commodore do not recommend the connection of more than one external drive unless they are powered from an external source. Some companies produce models with two drives in a single unit, powered with its own supply, but for most people one extra drive is enough.

Serial

The serial port is both an input and an output device and is used primarily for communications. The most common peripheral to be connected to this port is a modem, which allows your computer to connect to a phone line and exchange data over the phone with other similarly equipped computers. Because of the nature of serial communications, it doesn't actually matter what kind of computer you are talking to at the other end of the line. Software is required to drive a modem but the best programs are available either free or relatively cheaply under Public Domain or Shareware schemes.

The serial port is synchronous which means it can only send or receive in sequence at a regulated rate. Computers communicating in this way must do so at the same speed. the Amiga is fairly reliable up to speeds of 38400 baud, though you are unlikely to be able to find a phone (or an affordable modem) that can handle this speed.

Parallel Port

This interface, like the serial port, is both an input and an output. The parallel port is much faster than the serial port because it is asynchronous and not tied to a specific speed at which to operate. It also has multiple lines so data does not have to be transferred one bit at a time, but can be sent in bytes.

The parallel port is not often used for communications between machines though, because it is very expensive to encode multiple channels of information down a conventional phone, and it would also only be able to transfer data at the same speed as a serial device when used in this way.

The parallel port is used for local communication though, such as connecting the Amiga to a printer.

Many peripherals use the added speed of this port to their advantage. Samplers and digitisers, which require high speed data transfer, often use this port.

Audio ports

The audio connectors, one right and one left, are standard RCA phono plugs, so you won't have any difficulty connecting them up to an amplifier. They could also be connected to the audio input of a video, or a set of stand-alone speaker-amplifiers if you don't like the quality of the sound from your TV.

Video Port

This port provides the red, green and blue video signals, plus the synchronisation signals, which are required by RGB monitors. This is the best quality output you can hope to achieve on the standard Amiga. If you don't have a monitor, check that your TV doesn't have a monitor input before connecting up that nasty modulated signal.

Composite Output

The composite output is provided in the standard form used by composite monitors and video recorders. Although it is easier to connect (being just one lead) there is a lack of quality due to cross channel interference in the encoding and transmission process. It still has an advantage over the modulated output (because the modulated signal is essentially the same signal with a further encoding process on top) so you might like to use this if your TV or video has a composite input.

TV output

The modulated signal from this port can be directly connected to the aerial socket of a receiver. This signal carries both the sound and picture information, but it is not a very good quality signal as you will soon discover.

Power Socket

This is where the split power supply is delivered to the Amiga. The highest voltage here is only 12v, but it could still be dangerous, especially if you fuse or ground it. Try to make sure that the Power supply is firmly fitted to the Amiga before you turn it on. Many apparent problems with the machine are down to an ill-fitted power lead, so it's worth your while to check.

EXPANSION

AMIGA INTERACTIVE MULTIMEDIA

A NEW AGE IN HOME ENTERTAINMENT

AMIGA CDTV INTERACTIVE MULTIMEDIA

WHAT IS CDTV?

Simply put, CDTV mixes CD sound and Amiga type software in one easily controlled unit, and allows you to "interact" with the results through your television. On the outside the CDTV Standalone Player is a sleek, elegant black box. Inside it contains the workings of the UK's most popular home computer, the Commodore Amiga, but with two major differences. Instead of a keyboard and mouse it uses a video style remote controller for simple operation and, instead of a floppy disk drive, there's a compact disc drive.

MUSIC & SOFTWARE

As well as being able to play standard studio compact discs in high quality stereo sound, the CDTV can also use software stored on CD. This is similar to Amiga software, with thousands of Amiga programs available. You also get much, much more - a CDTV Disc is equal to over 600 floppy disks in capacity.

WHAT CAN IT DO?

With CDTV you can listen to your favourite pop group, look up history, play the latest arcade games, have a Karaoke night or learn French. In one unit, CDTV can do things you would otherwise need a video, CD player and computer to do! You can watch as Neil Armstrong walks on the moon, listen to him speak and read the fascinating details of how Apollo got there!

INTERACTIVE MOVIES

A new kind of movie; hi-fi sound tracks and moving pictures just like cinema films, but you determine the outcome and how the plot turns out! Will Batman really save Gotham City? Interactive movies are set to arrive on a CDTV near you soon.

EDUCATION

With its huge storage capacity, colour graphics and easy control, CDTV is ideal for education. Levels from primary education to adult foreign language courses are available.

ENTERTAINMENT

Packed with masses of colourful graphics, hi-fi sound and huge levels, CDTV games are set to dwarf their Amiga counterparts. The CDTV award winning version of Sim City for instance, has 10 Megabytes of extra graphics, studio recorded sound for CD Audio quality, more detailed game play (new zoom mode) and 4 different eras (Medieval, Western, Actual and Future).

REFERENCE

Imagine that you could refer to several encyclopaedia's at once, without having to constantly swap between publications, flip pages or refer to lengthy indexes across multiple books? CDTV Reference titles enable you to do this plus a lot more!

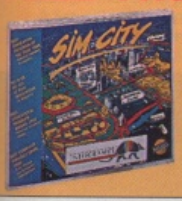
MORE FORMATS

CDTV can play CDTV software, CD audio discs, CD+G (audio discs with lyrics and pictures), CD+MIDI (special tracks along side the audio tracks control MIDI instruments attached to the CDTV). With the aid of a floppy disk drive and keyboard, CDTV can also run most Amiga software.

TECHNICAL SPECIFICATIONS:

- 68000 16/32 Bit processor running at 7.14MHz.
- 3 Custom chips for video, sound and graphics.
- Internal video expansion 15-pin edge connector and DMA slot.
- Analogue RGB, Digital RGB, Composite (PAL) video output.
- 512 Lines/Vertical frequency 60Hz display.
- Maximum 1Mb video memory, with palette of 4096 colours and 8 sprites per scanline.
- Centronics Parallel & RS-232 serial interfaces.
- External floppy drive (Amiga compatible), hardwired alternative to remote control for keyboard, mouse etc.
- 2 Audio ports (phono), MIDI IN and MIDI out. Stereo headphone socket. Smart Card slot for RAM/ROM cards.
- Sony/Philips type CD-ROM standard with an average access time of 0.5 seconds & maximum access time of 0.8 seconds.
- Data Capacity 540Mb
- Conforms to standard ISO 9660.
- 8 x Oversampling.
- Signal/Noise of -90Db.
- Audio Ouput to external output 1.4V RMS, 10K Ohm.
- Frequency response of 4-20 KHz.
- Sample rates of 44KHz to 6KHz.
- Channel Specification -85Db.
- Harmonic Distortion 0.02% at 1KHz.
- Max. audio capacity per disk 28hours, AM quality.
- Dual 16-Bit D/A convertor plus 64 levels of attenuation.

FREE FROM SILICA



SIM CITY CD

If you have ever played Sim City on a normal Amiga, you will be amazed when you see, listen to and play the Amiga CD version! Now even more addictive, with studio recorded sound and a massive 10Mb of graphics, Sim City CDTV is a life simulation game that has to be seen to be believed! Sim City comes free with every CDTV or A570 from Silica.

WORTH £29.99

CDTV ADD-ON FOR AMIGA OWNERS

AMIGA A570 FOR THE A500

- Enables your Amiga to run CDTV software
- Plays normal audio CD discs
- Storage capacity equal to 600 floppy disks
- Internal RAM expansion option (Coming Soon)
- Internal hard drive option (Coming Soon)
- Compatible with CD + G and CD + MIDI formats
- Transfer time 153Kb/second
- Compatible with CD-ROM industry standard ISO9660
- Comes with Fred Fish CDPD collection + Sim City FREE from Silica

Note: 1mb of Chip RAM/FAT Agnus is required for full compatibility with all CDTV software. Silica offer an upgrade service. Please call and quote REA 1000.

COMES WITH FRED FISH CDPD COLLECTION PLUS! FREE FROM SILICA SIM CITY WORTH NEARLY £50

The A570 is an essential add-on for your Amiga 500. CD-ROM is set to replace disks as the standard format for games and serious titles in the not too distant future. Most software companies have already announced plans to release CD versions of their software!

The sheer storage size of a CD (600 disks) means that using CD software is faster, graphics are enhanced and game play is increased with bigger levels, more complex problems to solve and larger areas to explore! And, being compatible with audio CDs, the sound quality from CD games is unrivalled! Sim City for instance has over 10Mb of data for its graphics alone and has music recorded in a studio! Silica's new low price of £299 means that there is no better time to buy the A570 and, with the award winning Sim City included FREE with every A570 from Silica, there's no better place to buy it from!

RRP ~~£349~~

SAVE £50! OFF RRP

£299

Ref: CCD 0588

AMIGA CDTV PLAYER

SLEEK BLACK DESIGN!

The original pack for non-computer users, very easy to use and set up. The CDTV Stand Alone pack blends in well with your standard home entertainment equipment and is ideal for the whole family.

- Based on the best selling Amiga computer
- Operated from remote hand held controller
- Plays CD audio discs
- Compatible with CD+G & CD+MIDI formats
- Upgradeable to a full computer
- Over 100 CDTV titles available
- Includes:- Lemmings: The addictive, award winning game. Hutchinson's: A vast encyclopedia

CDTV Player	£399.99
Lemmings	£34.99
Sim City	£29.99
Hutchinsons Encyclopedia	£49.99
Total Pack Value:	£514.96
Less Pack Saving:	£145.96
Silica Price:	£369.00

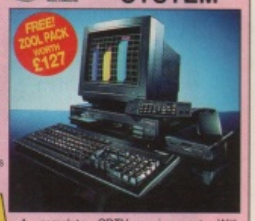
COMES WITH LEMMINGS + HUTCHINSON'S ENCYCLOPEDIA PLUS! FREE FROM SILICA SIM CITY WORTH NEARLY £115

£369

Ref: CCD 1000

AMIGA CDTV MULTIMEDIA SYSTEM

- Easy to use home entertainment system
- Infrared Remote Control
- Sleek black design
- Keyboard, disk drive and mouse included
- Based on the best selling Amiga computer
- Plays CD audio discs
- Compatible with CD+G & CD+MIDI formats
- Over 100 CDTV titles available
- Compatible with 100s of Amiga programs
- Fred Fish CDPD is a 'collection' of 660 disks of public domain software. It include utilities, applications, games and tools.



A complete CDTV environment. With keyboard and disk drive it is fully software compatible with the Amiga 500, and able to run all Amiga games and application software. With the peripherals included, you can unleash the full power of your Commodore CDTV.

CDTV Player	£399.99
CDTV Keyboard	£49.99
CDTV Disk Drive	£99.99
Fred Fish CDPD	£19.99
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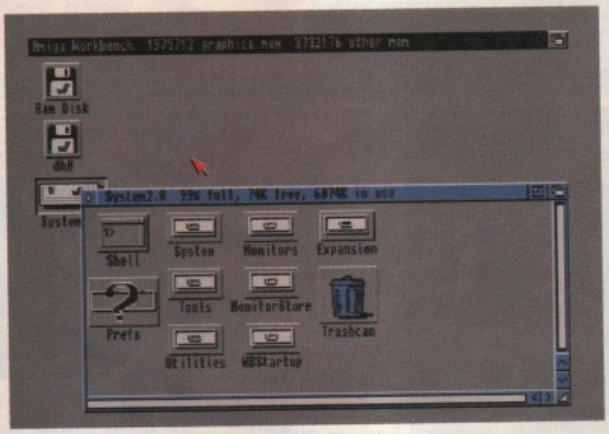
AMIGA DOS

Even if you only ever use your Amiga to play games, there will come a time when it is not only useful, but also necessary for you to dirty your hands with the business end of the computer. This little guide should help you come to terms with the operating system, which you may, in time, come to love and respect



AmigaDos is the operating system that is used by the Amiga range of computers, in various versions depending on which machine you have and when you bought it. The A600 uses AmigaDos version 2.1, and since most of the new additions to the Amiga world will own an A600, that is the one we will be concentrating on. If you have an Amiga 1200 or an A4000 don't worry. All of the things we are about to explain for AmigaDos2.1 will work on AmigaDos3 as well.

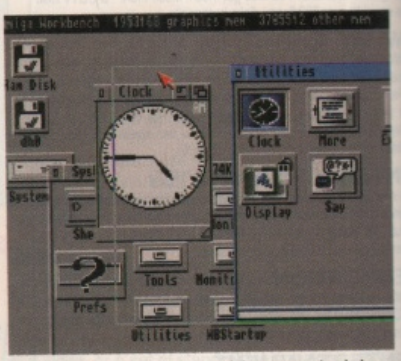
What is an operating system?

The operating system, or OS, is a software program that allows the user to interact with the computer and its devices, and to allow access to any of the files or applications which are stored on compatible media. Usually it is this software that you will run first when you turn on your computer, as it is necessary in order to use a lot of applications written for the Amiga.

The software for running the operating system is stored in two parts. the first part is in ROM on board your computer. This ROM, known as the Kickstart, contains the instructions for the startup-sequence of the computer and also instructions on how to access some of the machines devices, such as the floppy disk drive. A large number of sftware routines are also present on the ROM which enables slightly faster execution of programs.

The rest of the operating system is loaded in from floppy-disk.This is the Workbench disk that is provided with your Amiga. Although the disk is completely full, not all of the files are needed to make the OS work, as we'll see later.

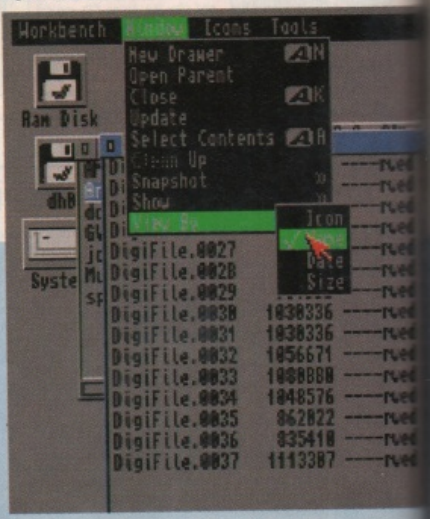
If you have graduated onto the Amiga from another home computer system, such as the CBM64, the Spectrum or the BBC then you probably haven't come across an operating system before. These machines had an interpreted BASIC language in ROM so in order to use the computer itself you had to program through the BASIC language. The operating system on the Amiga is more geared towards locating and executing files stored either in RAm, floppy-disk, Hard-disk or CD-ROM. In this way it is very similar to the Apple Macintosh and the IBM PC.



Windows may be dragged around the screen simply by clicking and holding the drag bar whilst moving the mouse.

Windows may be scrolled using the bars at the bottom and side.

Viewing files by name is the only way to get a good look at them without resorting to the CLI.



AMIGA

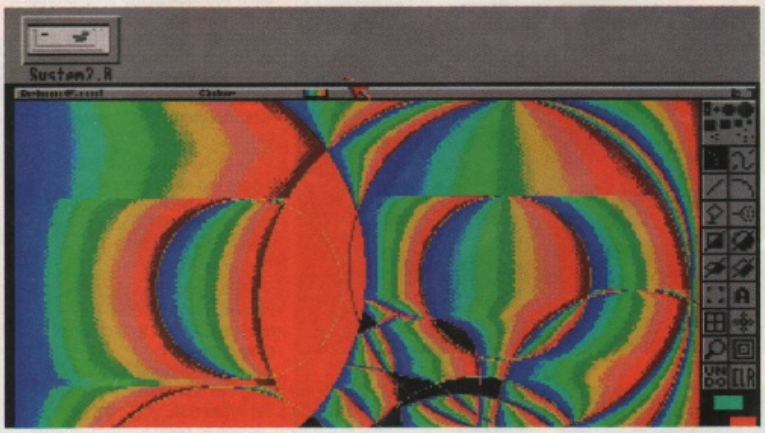
Who are you calling a WIMP?

The operating system is based on a concept known as Windows Icons Menus Pointers, or WIMP for short. What this means is that access to the computer is controlled largely via the mouse and not the keyboard. Xerox came up with the idea years ago that life for the computer user would be a lot easier if they didn't have to remember the names of files and take RSA typing stage three to be able to use their machine. Instead files should be represented graphically on the screen and the user should be able to access them simply by pointing and clicking with the mouse.

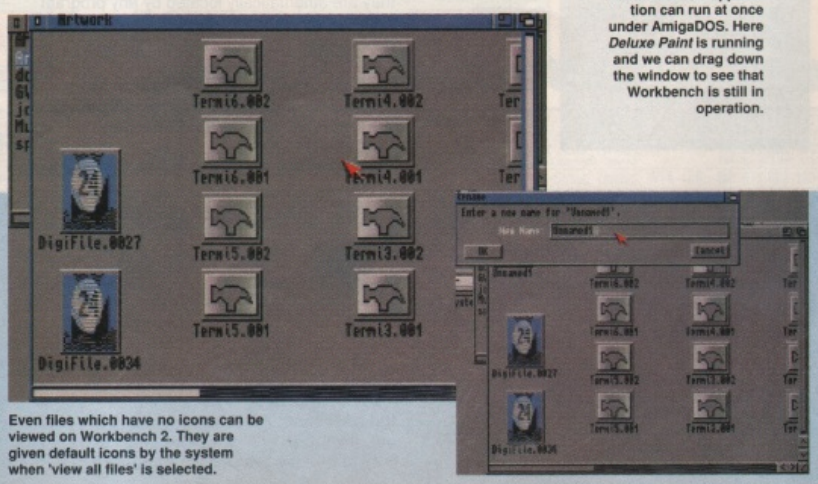
The little pictures (icons) and associated information on a file are stored in a seperate file under Workbench, called the "info" file. Thus for an application such as "Med", there will be another file called "Med.info". The Amiga Workbench differs from the Macintosh system in that some of the files are not given icons. This makes sense, especially when using a hard disk as the screen would soon be chock-a-block with all sorts of files. Usually only applications are given icons, because these are the files that user will wish to access. The data files containing information used by the applications are more often than not left without icons, which under normal circumstances means that you will not be able to see them. You can view them however, if you select the "Show All" option from the workbench menu. For example, boot up using the Workbench disk and wait for the startup routines to finish. Using the pointer, double clik on the disk icon and a window will appear in the middle of the screen. The window contains lots of drawers corresponding to various parts of the system software. Move the mouse inside the borders of the window and click once. Now hold down the right mouse button (or menu button) and you will see that the top bar across the screen changes and lists a number of topics. Still holding down the menu button, move the pointer to the word "Window". A list will appear underneath the word. This is a menu. Whilst still holding the button, move the pointer down the list to the item marked "show". When you reach this item another menu will appear to the side of the word "show". Now move the pointer over the words"all files" and release the menu button.

The disk drive will become active as information is read off it. When it has finished more drawers will be visible in the disk's window. These are directories which have no ".info" files, but corresponding icons have been created for them by the operating system.

Almost all Amiga applications follow the style conventions. One of these is that 'quit' is always the bottom option on the first menu.



More than one application can run at once under AmigaDOS. Here *Deluxe Paint* is running and we can drag down the window to see that Workbench is still in operation.

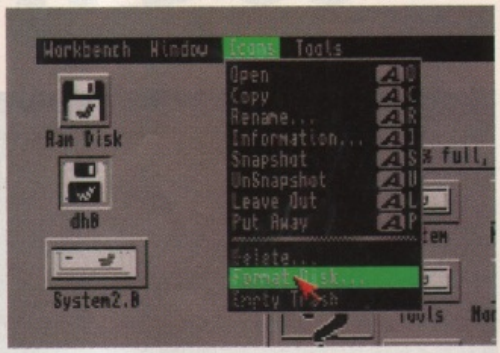


Even files which have no icons can be viewed on Workbench 2. They are given default icons by the system when 'view all files' is selected.

DOS

So what's this CLI thing then?

Formatting a disk is simply a matter of choosing a menu option – much less complicated than the PC.

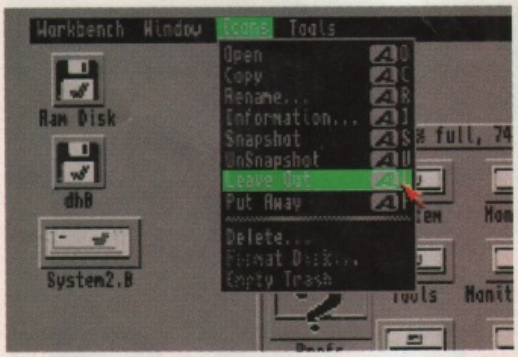


Although the WIMP system is very efficient and easy to understand, there are still some things that can be done better by a more traditional Command Line Interface, as used on the IBM PC. In fact the Amiga uses a mixture of the WIMP environment (like the Mac) and a CLI (like the PC) to give the user the best of both worlds. It is completely possible to use your computer using solely one of these methods, but a bit of both is usually preferable.

You can gain access to the CLI by double clicking on the "shell" icon, found on the workbench disk.

A small window will open up and you can then pretend that you are using a PC, by typing in commands (although not all the commands are the same as those in MSDOS). For example the command "dir" will list the directory that you are currently in, showing all the files that can be found there. The command "cd name" will change your current directory to a directory called "name". Directories are arranged on the disk in a tree fashion, and it is necessary to step along the tree to get to the place you want to be. Often this can be done with one command though. For example, to get to the printer device drawer on your Workbench disk you could use the command `cd Workbench:devs/printers'.

Note that a name with a colon after it is a device name. This can be the name of a disk (e.g. Workbench), the name of a physical device (e.g. Df0:) or the name of a logical device.



Leaving out icons means that they will appear on the workbench screen itself.

Sounds Logical

A logical device is one which, although it is not actually a separate physical entity, it is convenient to think of it that way. There are plenty of examples of logical devices on your normal Workbench disk.

The fonts directory is a logical device which is set up when you boot up your machine through Workbench. Try going into the CLI or Shell and typing:

"cd FONTS:" You will now be in the fonts device, but if you look at the shell prompt it says `Workbench:fonts>'. In effect, logical devices are simply a shortcut, but they can be very useful too.

In order to create your own logical device, you may use the Assign command. The syntax for this is:

"Assign devicename path"

where the two parameters are the name you wish to give the device and its ordinary directory path. For example, if we enter:

" Assign Printers: workbench:devs/printers"

then we have created a logical device attached to the printer driver directory.

You can change these assign simply by re-issuing the command. If you kept all your fonts on a separate disk, you may want to re-assign the fonts device to point to them, so that they are automatically located by any program which wishes to use fonts. You can do this by simply typing:

"Assign fonts: fontdisk:"

There are plenty of other useful commands which can only be really useful by accessing the CLI. Try reading about them and what they do in your AmigaDos manual.

YOU WHAT?

The names given to the various features of the WIMP environment can be a little confusing, so here is a little guide to what all that jargon really means.

Menu

These are the little lists that pop down from the top of the screen. The list contains elements known as items, and may in some cases contain further menus. Menus are accessed by holding down the right mouse button and moving to the top of the screen.

Pointer

The pointer is the red arrow which follows the direction of the mouse. You may change the design of the pointer to suit your needs, and indeed many programs will do this automatically when you run them.

Window

A window is a box within a screen. Windows usually have a title bar, with their name in, a resizing gadget and scroll bars so you can see what is contained within. A typical example of a window is the one which appears on the Workbench screen when you double click on a disk icon.

Icons are the small pictures which some files (usually programs) and devices are given to help you locate them on the Workbench.

String Gadget

This is the term used to describe a window containing nothing but a text box and a flashing cursor. These are often used by programs when they are asking for informain such as your name, or the date, etc.

Shell Hints

When using the Shell you can take advantage of some of the advanced editing options. The cursor keys will allow you to move backwards and forwards through what you have just typed and also the backspace and delete keys will allow you to delete forwards or backwards from the current cursor position. Using the `up' cursor invokes the shell memory, and you can scroll back through a list of commands that you have already issued since you ran the shell.

DOS

EASY ACCESS

Fortunately for the less able, Workbench now has an execute function available. Simply select the execute command item from the Workbench menu (or use the hot-key `Amiga-E') and a small gadget will pop up in a window on the Workbench screen.

You can type in any command you like, and it will be executed. The default directory for commands is taken to be the C: directory, but if you start with the pathname you can execute commands anywhere.

To use this gadget just click in the text window. When the cursor appears you may type in the command. Pressing return will execute it. If the command is one which generates an output, a window will be opened on the workbench screen to show you the result. This is an easy way to get used to the Workbench commands without having to trouble with using the Shell.

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.....

..... Postcode: .....

Tel (Home): ..... Tel (Work): .....

Which computer(s), if any, do you own? 55L

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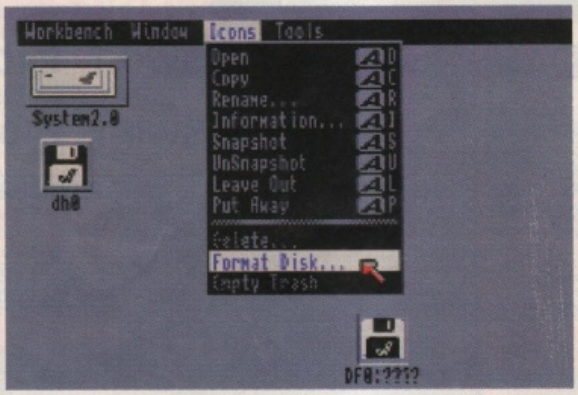
DISKS

The fundamental unit of data storage is the floppy disk. They are small (3.5" isn't big no matter what Tony Horgan says), plastic and usually a rather unpleasant shade of blue – but how much can you fit on one and, more importantly, why aren't they floppy?



To format a blank disk you simply have to select the disk by clicking on its icon and then select format from the Workbench menu.

Unless you are fortunate enough to already own a hard drive, you are going to be spending a great deal of time dealing with small squares of plastic known as floppy disks.The floppy disk is one of the most bizarre parts of the entire computer industry.There are at least two things you should know about floppy disks. The first is that they are not floppy. Not unless you leave them under the grill for too long. The second thing you should know is that (as I'm sure you've guessed by now) they are not disc-shaped. They are in fact more or less square.The reason they are called floppy disks is not necessarily to confuse people, but because they do actually contain a floppy disk inside.

The disk is made of a thin bit of plastic coated with a compound containing iron oxide granules. Data is stored on this surface magnetically by the disk drive head, which, when in operation, floats slightly above the surface of the pinning disk. The accuracy this gives allows around 880k of data to be stored on just one disk. That's about the same information as an airport paperback, but your computer doesn't have to go on holiday to Cyprus to read it.

Format

The disk format is the set of rules by which data is organised on the disk. If there wasn't a format, the computer wouldn't know where to look for the data or what sort of data it was, even if it could find it. AmigaDOS disks are organised on a system of 512 bytes in a block, 11 blocks to a track, 80 tracks to a surface and two surfaces to a disk. Some of these blocks are reserved for use by the computer, to store directory information on and to indicate what type of disk it is.

The 'boot' block of the disk indicates whether the disk is just an ordinary data disk, or whether it is one that the computer should try and boot up from. If it is a bootable disk, small programs can be inserted into the boot block which are executed when the disk is read during startup. This is the method games use so that you don't have to go through AmigaDOS first in order to use them.

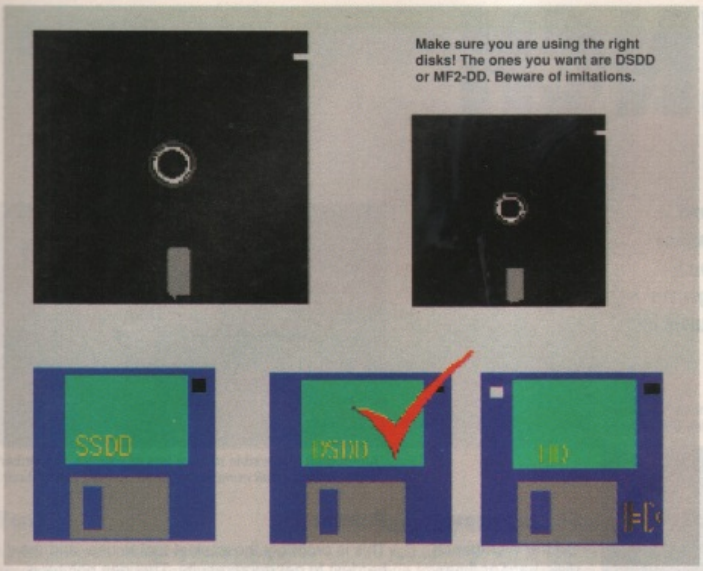
Before a blank disk can be used by the Amiga, it has to be formatted. This is quite a simple operation. Insert the disk into your disk drive and wait for the computer to recognise it. It will have a few goes at trying to read information and then give up, leaving a standard icon on the screen with a label of "DF0:BAD????", which just means that AmigaDOS hasn't recognised the disk.

Select the icon by clicking on it once with the left mouse button and then select 'Format Disk' from the Workbench's 'Icon' menu. A small requestor will appear, asking if you are sure that you really want to do this (in case you have accidentally selected format) because any data on the disk will be lost. Since you have no data, there is nothing to worry about so just click on 'Okay'.

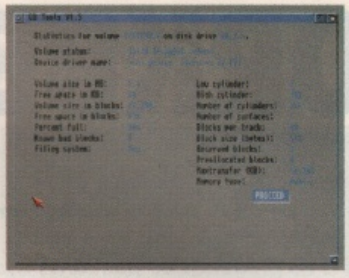
After about a minute the disk will be ready to use. You may notice that there is a quick format option when the requestor pops up. This is only to be used if the disk you are formatting has previously been formatted as an AmigaDOS disk. This option is provided because it is often a lot quicker (and less messy) to re-format a disk rather than delete all the files on it.

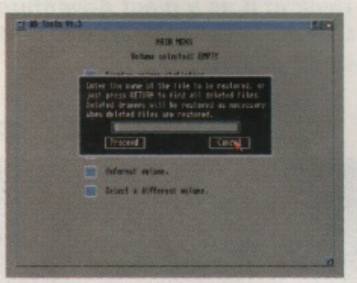
DISKS

Even a completely formatted disk will have some data on it. Disks are automatically formatted to have a trashcan directory on them.



Make sure you are using the right disks! The ones you want are DSDD or MF2-DD. Beware of imitations.





Programs like *Quarterback Tools* will help prevent a problem turning into a crisis.

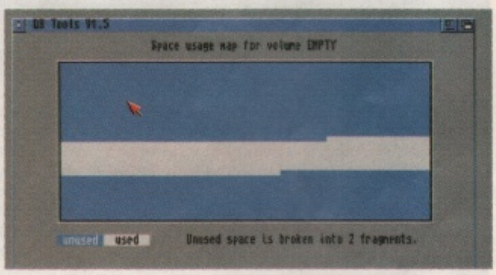
Protection

Today's floppy disks are a lot more reliable than the older types such as the 5.25" and 8" disks you may see in some museums. The old disks were made of the same material, but instead of a plastic case they just had a cardboard sleeve. Worse than this, there was no metal flap or anything, just a hole which left the magnetic material exposed to the air! The 3.5" disks are much better protected (they even contain little cleaning pads to prevent the build-up of dust on the disk's surface) but you can still have some problems. In the result of a disk error, the Amiga may claim that your disk is unreadable and suggest that you try using the diskdoctor program to correct it (as found on the Workbench disk). This is a definite last resort. There are much better disk rescuing programs around, such as FixDisk (which is Public Domain) and Quarterback Tools (which isn't). Usually the error is only on one block or track, so probably over 90% of the files on the disk are still okay and can be rescued using the right software. Unfortunately if the error is on a commercial disk, especially a games disk, even losing one file can render the entire software package unusable. Now you know why everyone tells you to make backups.

Copying Disks

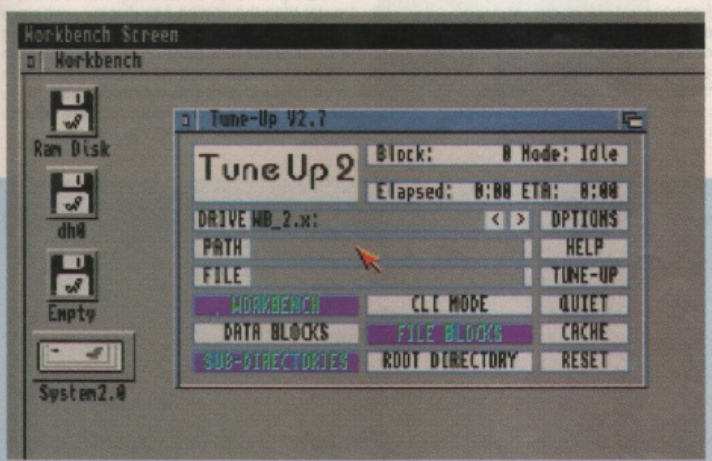
There will probably come a time when you will need to make a copy of a floppy (like when you are making all those backups that we told you to). This is quite easy to do under AmigaDOS, but can be slow if you have only one drive (because you'll have to swap the disks a few times, depending on how much memory you have available).

To do this simply insert the disk you wish to copy and select it using the mouse. Then choose 'copy' from the Workbench's Icon menu (or use the Amiga-c hotkey). A box will appear on the screen asking you to put in the source disk (in this case the one that is already in there) and click 'Okay'. Just click Okay and the computer will read the data on the disk. When it hasn't got any room left in memory it will ask you to put in the destination disk. Just swap the disk for the one you wish to copy onto and click okay. When you have finished you will end up with an exact duplicate of the first disk, except it will be called 'copy_of_xxxx' where 'xxxx' is the name of the original disk. You don't need to have formatted the destination disk, as because it is a direct copy of the original all the format information is copied over too.



All the files on an optimised disk are arranged around the root directory for speed. They are also allocated to regularly spaced blocks to enable the drive to read them in one continuous action.

Disk organiser programs will minimise the time taken to access data by re-recording it in a sensible way.



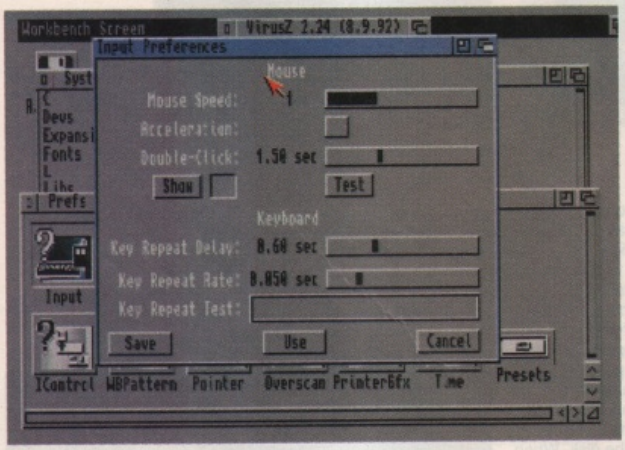
Disk Do's And Don'ts

- Do store disks vertically upright
- Do keep them in a box or other container
- Do attempt to label them
- Do write-protect important disks, such as original software
- Do keep back-ups
- Do use reliable disks, branded ones often come with a guarantee
- Do use Double Sided, Double Density disks
- Do regularly check for viruses

- Don't rest coffee mugs on disks
- Don't scatter them around a disk
- Don't smoke 20 Bensons over them
- Don't use a disk which doesn't have a metal protective cover
- Don't leave them near a telephone, loudspeaker or other magnets
- Don't let them get too warm or too cold
- Don't eat them
- Don't send them back to me saying they don't work

WORKBENCH

The Amiga Workbench is where you will spend most of your non-game playing time so it's important to make it as pleasant as possible. In fact, some users think of it as a giant Adventure game in its own right, with hidden treasures to be found in the most obscure places.



Some of the preferences have more bearing on daily life than others.

Once you begin to get to grips with the Amiga, you will soon find that you prefer some options over others. The beauty of Workbench is that you adjust the system to be exactly the way you like it, and know that that's the way it will be every time you switch on.

Backdrop or Screen?

One of the first decisions you'll have to make is whether to make your Workbench a Screen or a Window. This is chosen from the Backdrop option in the first Workbench menu. It's purely a matter of taste – I like mine to be a screen to help avoid clutter. You may like having it as a window which you can then send to the back or pull to the front of any other windows. To make your choice stick, you'll have to load a tool from the Prefs drawer, change nothing, and then select 'Save'.

Note that if you chose to leave the Workbench as a window you can actually turn it off by clicking on the close gadget. This is useful occasionally, but remember that once you have closed it in this way there is no way of getting it back!

Startup drawer

On the Workbench disk, hard or floppy, is a drawer called 'WBStartup'. Anything you place into this drawer will be run on boot up. So, for example, if you wanted a clock to always appear on your screen without having to ask, simply drag its icon into the drawer.

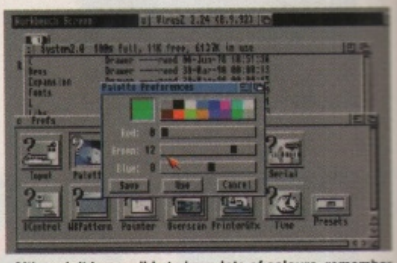
This works with IconX script files as well, which is very handy for running assign scripts if you have a hard drive.

The startup drawer is a good place to put your virus checker as it will immediately become active and you won't have to worry about forgetting to start it. Also, some viruses can fool virus detecting programs if the virus is in memory before the virus checker is initialised. It makes sense to make this the first thing you run when you start up.

The Prefs Drawer

There are so many ways of altering the Workbench, that the control programs have all been split up and placed in one drawe – the Prefs drawer. In here you'll find programs for changing everything from the shape of the pointer, to the size of the Workbench screen.

All the preferences set in this drawer are saved to special files so that the Workbench will always be set up the way that you want it.There are a lot of preference programs, but the files they create are quite small so you can copy these onto any boot-up disk without having to have all the programs on as well.



Although it is possible to have lots of colours, remember that only a small number are used by the system itself.

Pointer

This is probably the easiest tool to use, and the hardest to get good results. The idea pointer is accurate, but not obtrusive. Everyone has their person favourite, and I reckon it's about time we had a competition to find the best.

WBPattern

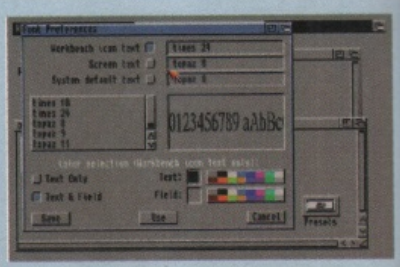
Ok, so it might seem trivial, but a nice relaxing backdrop can make all the difference. Try to avoid very busy backdrops or you'll get a splitting headache trying to read text. Both the Workbench and the Window patterns can be chosen separately to help you differentiate between them. Those of you lucky enough to be using Workbench 3 can actually use full-screen sized pictures.

This is a bit on the ridiculous side because there are very few pictures that you will actually be able to make out your disk icons over the top of. That said though, there is a certain amount of enjoyment to be had from copying disks on a remote carribean island populated only by... yes, well I'm sure you can see how easy it is to get carried away.

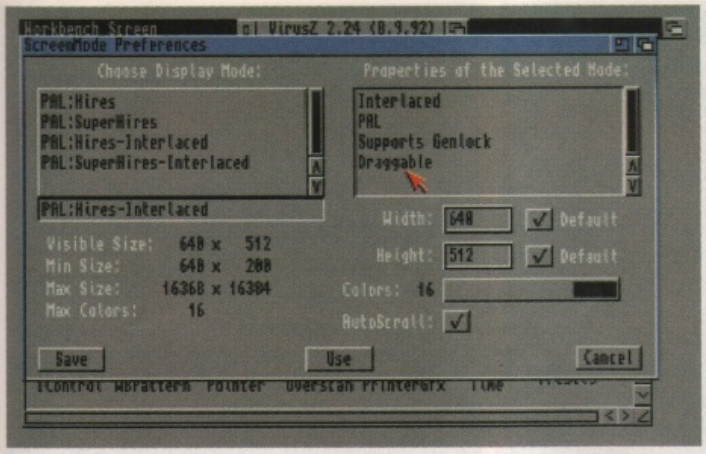
ScreenMode

This tool is easily the most powerful available. Not only can you define which sort of Workbench display you want, but you can also choose to have as many as 16 colours on the Workbench (which can get a little slow), or as little as 2 (which is boring). A little known fact is that you can also have Workbench sizes which are actually greater than the screen can display – when you move your pointer off the side, the screen scrolls to show the new parts. The Palette tool can be used to define any new colours you may have created, or to alter those already used. Workbench 3 owners can select up to 256 different colours – that should keep you busy.

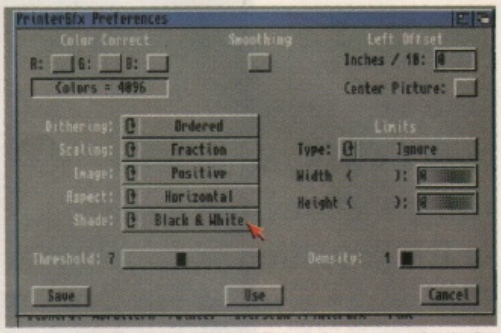
WORK



Fonts should be chosen with care, especially when fiddling with the default text.



Remember that more colours uses more memory when you start playing with the screen-mode



The graphics preferences you choose can seriously alter the quality of output from your chosen device.

Font

Once you start changing the screen size, you may find that the text is a bit difficult to read. No problem – use the font requestor to choose a larger size. Some application programs may have problems using the new font, so this may limit your choice to those which aren't too outlandish. The text that the icons are named with, the text used for Window titles and the CLI text can all be chosen separately. Remember the choice is to make your Workbench easier to use – not to make it look like a Letraset catalogue.

Overscan

If you hate to think of all that wasted screen which is used to form a border, you can cause the screen to 'overscan', and enlarge the Workbench area. The enlargement will depend on the television or monitor used.

Overscan is quite important if you are going to be using the Amiga for video work. Normally the Workbench screen doesn't get to the edges of the video image, so if you were recording an animation or trying some titling with a genlock you would be limited to the centre of the screen.

Fortunately the advanced video chip in the Amga allows you to increase the resolution of the Workbench screen to almost fill the entire video picture area.

Input

If you are having problems controlling the mouse, try altering the speed available from this tool. You can also choose whether or not to have acceleration active: this will make the pointer move faster the more you use it, and takes a bit of getting used to! Key repeat rates can also be fine-tuned here.

Parallel, Serial and PrinterGfx

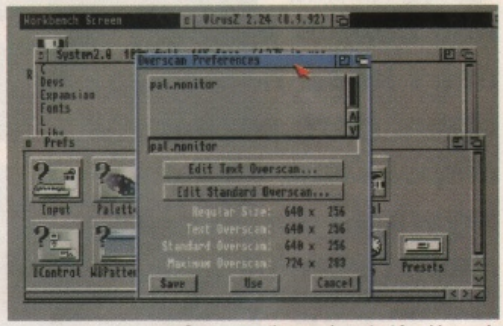
If you add a printer to your system, you'll have to inform the Amiga what sort it is. If you can't find your particular printer listed, it's a relatively safe bet to start with the EpsonX driver first. If you are using a modem, you can alter buffer sizes and protocols with the Serial tool, although your Comms software might use its own defaults..

Making your changes permanent

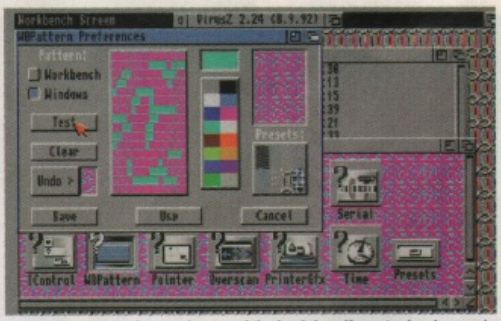
All the tools in the Prefs drawer have 'use', 'save' or 'cancel' gadgets. If you select 'use', the new options will come into force, but nothing will be saved – the next time you boot Workbench everything will be back to normal. If you select 'save' the new preferences will come into force everytime you boot the computer from your normal Workbench disk.

All the tools also have a "Save as..." menu option. If you make use of this feature, you will be able to put together a collection of different preferences for different occasions. You may have a huge multi-coloured extravaganza to impress PC-owning friends, a 2-colour extra small Workbench for memory tight situations and a normal every day option.

With Workbench, the choice is yours!



Overscan options are important for video work.



You can make a real mess of the backdrop if you try hard enough.

The pointer is one of the first things to experiment with.

Leaving icons out

Being able to take an Icon from its parent window and leave it on the Workbench is a very powerful way of customizing your system. All you need to do is highlight an Icon and select 'Leave Out' from the Icon menu. I have a paint program, a word processor and a comms program always on my Workbench, ready for immediate use. This feature works best when you have a hard drive, which will avoid any disk swapping on boot-up.

You can leave out icons on a normal disk too, it doesn't have to be a bootable disk. This is very useful on a floppy based system. If you leave out an application, and snapshot it then every time you put that disk in the drive the icon will appear on the Workbench – with no need for you to open the disk window.

GRAPHICS

One of the most amazing things about the Amiga is its graphic capability. But what good are all those colours, sprites and copper bars. if you don't know how to use them. Here we hope to dispel some of the mystique surrounding Amiga graphics.

If you bought your Amiga for its amazing graphics capabilities you'll not be disappointed. The basic Amiga 600 is capable of an astounding colour resolution of 4096 colours, with screen resolutions varying from 320x256 to 640x512 viewable on a standard TV or monitor.

To obtain these displays the Amiga uses a series of bitplanes to make up the images in memory. You don't need to know how this system works to be able to use an art package and draw wonderful pictures (or "interesting" pictures if you are artistically challenged), but a basic understanding is helpful in understanding why some things are simply not possible. So off we go:

What's a Bitplane then?

A bitplane is a term used to describe an area of memory set aside for the graphics display of the Amiga. Imagine it not as a continuous area of memory, but as a rectangular screen shaped block in your computer's chip RAM. Each binary "bit" of this area represents one pixel on the screen, and gives information on whether that pixel is to be turned on or off.

In two colour mode there is only one such "bitplane" of data, because there are only two possible combinations (either the bit is on, or it is off). For more colours further planes of memory are added, up to a total of six on the A600. Each further bitplane is mapped on top of the first, so they are all the same size, but now you have two or more bits of memory referring to the same screen location.

Two bitplanes gives a total of two bits of data for each pixel, which means there are four different combinations for each screen location. This translates to four possible colours. As you can see the number of colours goes up by a factor of two every time a new bitplane is added, up to a maximum of six, giving a total of 64 colours possible using this method.

It also means that the amount of memory used by the computer to display the image goes up arithmetically, in a screen sized chunk every time another bitplane is added.

For example, a 320x256 2-colour screen takes up a total of (320x256 bits = 10k), whereas a 32-colour image the same size would take up five times the amount of space (because it is five bitplanes of data) or 50k. This may seem a very small amount of memory compared to the gargantuan 1Mb available to you, but try imagining an animated sequence of 25 frames (which is only one seconds worth if run at a decent speed for proper animation) and you'll end up with a massive 1250k of memory – a good bit more than is available to the standard Amiga.

The size of the screen also effects the ability of the Amiga to animate it properly. If we are talking about 25 fps (frames per second) animation then you are asking the custom graphics chips to process that 1250k of information every second! Even a mono image animated at that speed would require 250k of memory. This is not outside the realms of possibility for a machine as powerful as the Amiga, but as we have seen, memory is in short supply. So what's the answer?

Eight bitplanes means 256colurs and, if you like, all those colours can be grey. The AGA chips do not suffer from the same palette restrictions when it comes to mono work as the old ECS chips. Not that many people can tell the difference mind you.

Top left: A1200 owners will be able to display 260, 000 colours in HAM8 mode, leaving A600 owners with only 33 to play with (right). Dither modes (bottompictures) can enhance the graphics dramatically though.

Compression

In order to maximise your value for memory the images are usually compressed in memory. There are various ways of doing this but essentially the technique involved is the same. Much of a picture is usually made up of large blocks of a single colour, so instead of remembering every single pixel of information the Amiga simply remembers the colour for the whole block and how big the block was.

It's a bit like a Pot Noodle really, all the useless watery stuff is taken out so you end up with something much lighter and more compact. In computer terms this means it takes up less memory and therefore is less time consuming to move about.

However, like the Pot Noodle, it also means that it takes a bit of time (to add the water again) before it can be used. This means that although you are saving memory or storage space, it takes slightly longer to retrieve the information. What you gain in effective use of space is taken away again by increased processor time.

Animations use a different approach from static images though. Working on the principle that each successive frame is only going to contain slight changes from the previous one, an animation file contains only the initial image and then a sequence of the bits that have changed (this is known as delta-shift encoding if you want to impress your friends). That is why animation files are stored in a different file format to ordinary pictures.

GRAPHICS

The Alternative

The alternative to bitmap graphics is structured graphics. Instead of being built up of pixels, these are built up of mathematical lines and shapes. The advantage of this is that the pictures are not limited to a particular resolution. A circle is still a circle whatever size you choose to display it. Using conventional bitmap graphics shapes and text become distorted as you magnify them, but structured art retains its shape.

Of course, the objects still have to be rendered before they can be shown on the screen, which makes them a little slower than bitmapped packages, but a lot more flexible when it comes to design work. There are a number of structured art packages available for the Amiga, from *Expert Draw* to *Professional Draw*, they all operate on these principals.

Hang on a bit...

At the beginning we said the standard Amiga could display 4096 different colours, but then we said that it could only use six bitplanes. Two to the power of six is only 64, so where do the extra colours come from.

Well, the 4096 colour mode is a bit of a cheat. It is known as Hold and Modify mode, or HAM for short, and that may give you an idea of how it works.

Instead of using the bits of data as discrete colour information, HAM mode uses these values as an offset from a base colour. It is slightly similar to the delta-shift technique used in animation files – instead of containing information about the whole colour, the data simply represents how much the present colour has changed from the previous one.

This does have its disadvantages. For a start it is not possible to use the HAM mode on anything other than a low resolution screen (320x256 pixels). It also means that colours blend into each other, sometimes with unsightly fringing effects (because the two adjacent colours are too different for the colour to change in one go). Another point to remember is that all this calculation takes up processor time (you can check this out by running a program like *DPaint* in Ham mode and checking how long it takes to redraw the screen after, say, a magnify operation).

On the whole, though, HAM mode gives exceptional results and the fringing problem rarely occurs in "realistic" images, like ones obtained from a scanner or digitiser.

Things to get

There is probably more graphics software on the Amiga than any other type of application. Here is a brief list of the programs to look out for

DELUXE PAINT IV :
Deluxe Paint has always been the standard graphics package for the Amiga. *DPaint III* is still available and is given away in some Amiga packs, but the true potential of the Amiga is not explored unless you have *DPaint IV*.
As well as enhancements such as light tables, extended fill operations and a rudimentary morphing feature, this version is the first in the series that allows you to manipulate HAM images with a 4096 colour palette. The animation section also allows full screen animation of HAM images.

DELUXE PAINT IV AGA
This is the latest version of *Deluxe Paint* and is more or less identical to the version above except that it has enhancements to cater for the AGA chipset found in both the Amiga 1200 and the A4000. This version is of no use to you unless you have either of these machines. If you do, you will now be able to use all eight bitplanes, giving 256 colour images, and the new HAM* mode, giving a total of 262,000.

PROFESSIONAL DRAW 3.
This is a structured art package which enables the construction, display and printing of object oriented artwork, as described in the main text. *Professional Draw* is the fastest and easiest to use structured art package for the Amiga, with more features than any other. With macro links to the *Professional Page* DTP system, and user definable ARexx macros this software is the most professional you can find.

BETTER PICTURES

Just because the Amiga as it stands cannot display 24-bit graphics, like machines which are used in professional graphics applications such as TV work do, it does not mean that you cannot create them. In fact there are several packages on the Amiga, such as ASDG's *Art Department Professional*, which are designed specifically to handle 24-bit images. These can still be used for DTP or video work if you are using a bureau to produce the finished article.

Some 24-bit adaptors are available for the Amiga which enable it to display these images directly – though these can be beyond the price range of most people.

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- LASER
- THERMAL

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GP-108 laser includes 1 year on-site warranty. On-site warranty not available with Smart Label printer.

9-PIN 192cps PRINTER

NEW LOW PRICE!

192 CPS **80** COLUMN

- *Seikosha SP-1900 Plus - 9 pin - 80 col*
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- *1K Printer Buffer + 2 Fonts*
- *Parallel Interface*
- *Graphics Resolution: 144x72dpi*
- *Epson and IBM Emulation*
- *Auto Sheet Feeder Option*
- *FREE Silica Printer Starter Kit*

PRINTER RRP	£155.00
STARTER KIT	£25.00
TOTAL VALUE:	£180.00
SAVING:	£80.01
SILICA PRICE:	£99.99

£99.99

+VAT = £117.49 Ref: PRI 8195

9-PIN 300cps PRINTER

NEW LOW PRICE!

300 CPS **80** COLUMN

- *Seikosha SP-2400 - 9 pin - 80 col*
- *300cps SD, 240cps D, 60cps NLQ*
- *21K Printer Buffer + 5 Fonts*
- *Parallel and Serial Interfaces*
- *Graphics Resolution: 240x144dpi*
- *Epson and IBM Emulation*
- *Optional Auto Sheet Feeder Unit*
- *FREE Silica Printer Starter Kit*

PRINTER RRP	£199.00
STARTER KIT	£25.00
TOTAL VALUE:	£224.00
SAVING:	£89.00
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£135

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240 CPS **80** COLUMN

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- *Epson Emulation*
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- *FREE Silica Printer Starter Kit*

PRINTER RRP	£199.00
STARTER KIT	£25.00
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144 CPS **80** COLUMN

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- *Epson and IBM Emulation*
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PRINTER RRP	£299.00
STARTER KIT	£25.00
TOTAL VALUE:	£324.00
SAVING:	£105.00
SILICA PRICE:	£219.00

£219

+VAT= £257.33 PRI 8602

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- *Compact Design with Straight Paper Path*
- *Requires CAB 7500 for PC - £9.95 or CAB 7614 for ST/Amiga - £14.95*

RRP ~~£699~~ + VAT

SILICA PRICE

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RRP ~~£249~~ + VAT

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PC VERSION NOW INCLUDES WINDOWS DRIVER

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On-Site Warranty not available on this product

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- ***3½" Disk with Amiga & ST Printer Drivers***
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Printer owners may order the Silica Kit (ref: KIT 5000) for only £24.38 - £5 off RRP! WORTH £29.38

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Before you decide when to buy your new printer, we suggest you think very carefully about WHERE you buy it. Consider what it will be like a few months after you have made your purchase, when you may require additional peripherals and accessories, or help and advice. And, will the company you buy from contact you with details of new products? At Silica Systems, we ensure that you will have nothing to worry about. We have been established for almost 14 years and, with our unrivalled experience and expertise, we can now claim to meet our customers' requirements with an understanding which is second to none. But don't just take our word for it. Complete and return the coupon now for our latest FREE literature and begin to experience the "Silica Systems Service".

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Which computer(s), if any, do you own? 84E

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SOUND

If you did any research before you decided to get an Amiga, then you must have heard hundreds of fantastic music demos on the Amiga, and wondered how it was done. Now read on...

Dedicated sampling software has become very sophisticated on the Amiga.

The Amiga's sound capabilities may not have improved in the last seven years, but that doesn't prevent it from still being one of the most advanced home computers when it comes to sound. Only recently has this power on a home computer been overtaken by a new rival, the Atari Falcon – but if you consider the respective prices of the machines, you've still got a bargain.

More about Paula

The fundamental thinking behind sound generation on the Amiga is a quantum leap from the old style sound generation chips on home computers. In the old days (or the present day if you still have an ST) sound worked on modulating the signal from a waveform generator. This was all very well if you wanted to simulate transformer hum or pure notes, but it was next to impossible to generate anything that sounded like it might have originated in the real world.

Paula is quite cunning. Instead of generating a waveform, the Paula chip just replays digital data, very much like a CD player. In effect it's a sampler in reverse. Instead of converting analogue waveforms into digital data, it goes the other way around.

The downside of this is that the samples tend to take up a rather large amount of space, but with the modern home computer you have more space to play around with. Unless you were to try recording an entire album track, you should have plenty of memory for quite long samples.

The going rate

In order to save some space the samples need not be played back at the fastest rate. The Amiga is capable of playing samples back at around the same speeds as a CD player, but often this is just wasteful. A lot of sounds can be played back at half the rate with no real difference.

Halving the rate means half as many sample points, so you either halve the amount of space the sample takes up, or you could double the length of the sample.

Paula actually has a pair of stereo channels, all of which can replay sound samples simultaneously. Musicians and musical engineers may be horrified at the thought of the lack of stereo imaging (i.e. each sample coming out of only one speaker) but you can use stereo samples as well (although these obviously take up two of the channels, one on each side). Most people won't be able to tell the difference if they are using a TV (where the sound is mixed into mono) or a stereo monitor (where the speakers are so close together you wouldn't notice the spacing unless your face was against the screen).

Sampling

Because the Amiga simply replays samples it is incredibly simple for the home user to record their own without any specialist knowledge. All you need is a sampler and a suitable sound source – a tape recorder, CD player or even just a microphone.

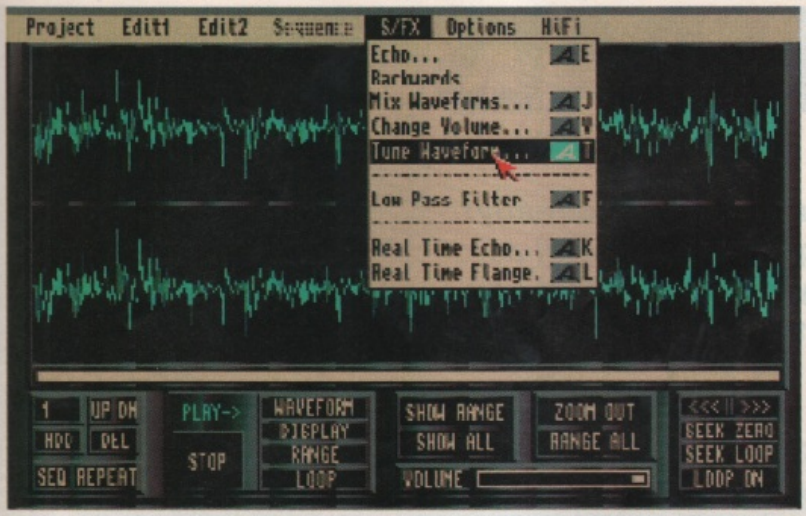
Many sampling packages exist for the Amiga, and they are not very expensive at all (about £30-40) so even if you just want to record a few silly noises to liven up Workbench you have no excuse.

There is even a whole range of sample CDs around, which are designed specifically to be used by sampling packages (okay, they are intended for use with professional sampling equipment, but that doesn't stop you from using them). The content of these discs vary from sound effects to classical instruments.

Another advantage to having a variable rate sound chip is that you don't necessarily have to play the sample back at the same rate as you sampled it at. This means you can effectively (if not scientifically) alter the pitch and play a whole scale with just the one sample. If you sampled a trumpet for example, you would only need one sample to play a very effective solo.

SOUNDS

Various processing effects are possible with most software.



Audiomaster has the best range of processing effects, some of which can operate in real-time.

View from a bridge

You can of course take this a whole step further and compose entire tunes out of your samples. Because these are stored as a list of sequences of different samples, it is possible to construct very large tunes instead, as all of us here at CU know only too well when once again the strains of breakbeats and "my mummy says..." drift from Tony Horgan's magical music cupboard.

There is a lot of commercial software available that will let you do this simply and effectively, but the established tradition is to use one of the 'Soundtracker' clones. These are music compositors for the non-musician, where tunes are put together rather in the manner that programmers would have music written. This works out quite well because it makes it very easy to include the tunes in any programs you happen to write.

MIDI

There is a way to use your machine for helping record music professionally. This doesn't have very much to do with the sound capability of the Amiga though, but it does entail using your machine as an intelligent conductor of other musical instruments.

There is a standard amongst the manufacturers of electronic instruments which has been designed to help join a whole load of instruments together. This standard is called MIDI and consists mainly of a sort of serial network. All the instruments are connected together by their MIDI ports and can thus synchronise their playing to a common time signal.

In order for this to work effectively you need a machine which sends out the data telling the instruments what notes to play and when to play them. This is usually the job of a dedicated sequencer, but there are certain advantages to using a proper computer for the job. This is where the Amiga comes in. Equipped with a MIDI interface, it can direct the playing of more musical instruments than you could comfortably fit in your front room.

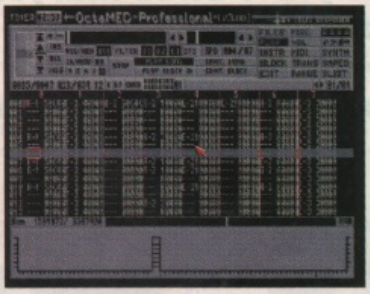
Because you are using a computer you can easily compose all your songs (with the relevant software) and simply save them to disk, for a performance anywhere. It worked for New Order anyway...

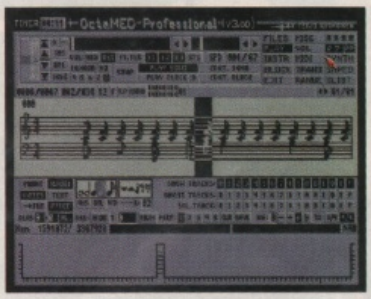
The ST used to be the musicians first choice when it came to a home computer, mainly because it has built in MIDI ports (you have to buy them separately for the Amiga) but this has changed recently as the software on the Amiga has improved dramatically. *KCS*, produced by Dr. T (the best music software company, who program for a large number of machines) is, at the moment, most advanced in the Amiga version – so much so that top artists like Madonna have used it whilst producing albums.

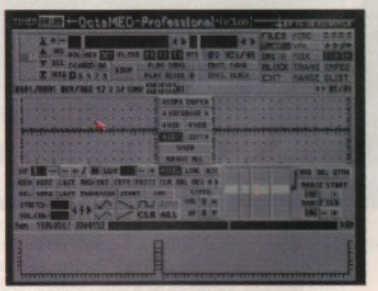
Better than life

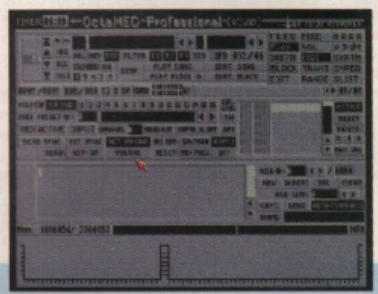
Just because the Amiga doesn't come with CD quality sound doesn't mean that you can't produce it. There are now a number of 16-bit sampling cards available for the Amiga with facilities for direct to disk sampling. Effectively this means that you can digitally master an entire album on the Amiga (provided you have a big enough hard disk, about 600Mb would do). Having all the data on disks means it can just be sent away to a CD mastering factory and reproduced – a true DDD recording, which is more than a lot of artists can manage at the moment.

OctaMED is probably the most famous, and certainly the most flexible, *Soundtracker*-style program available. It was given away with CU Amiga in July.





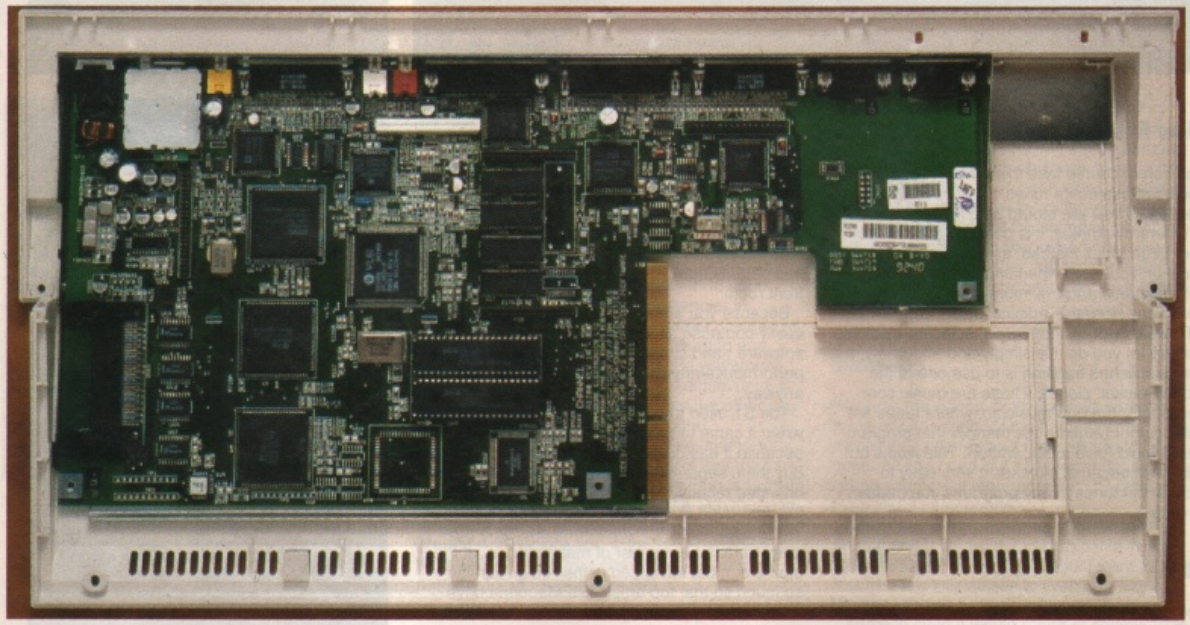




Song playing modules can replay tunes without the overheads of a compositor package.

PERIPHERALS

So you're bored with your new Amiga already? If your beige beast isn't quite as powerful as you'd hoped, we'll show you exactly what you need to make the machine of your dreams.



There is a lot inside an Amiga , but there could be a lot outside it too if you want to spend the cash.

Nothing is perfect, even an Amiga straight out of the box. Through cost and market restrictions Commodore have to make compromises. Thankfully, the next generation of the Amiga has improved the situation somewhat, but for most of us some extra expenditure is needed to create a useful system (or at least one that you can use without going irrevocably, totally, barking, raving mad, or as we should say, rationally challenged).

External disk drive

Before you go completely mad watching "Please insert disk Workbench for the umpteenth time" messages appear on-screen, an external floppy drive should arguably be your very first foray into the world of Amiga peripherals.

Thankfully, this needn't be a stressful, or even a very expensive business — drives are available from most dealers and hundreds of mail order companies.

Prices start at £50 for a "Prima Addup" from First Computer Centre, and just keep on going. Don't pay more than £70 for a single drive, or you are being done.

With two drives available to your Amiga the disk-swapping messages will be reduced dramatically. The only drawback is that the extra drive takes up some of your precious memory, so that's next on the list.

PERIPHERALS

A hard drive is useful, nay, essential if you don't wish to be driven insane by constant disk-swapping.

MISC

Next up we have all those things that you really need, but never seem to have. By the way, it makes an ideal list for those buying presents for Amiga owners!

Blank disks & labels

Basically, you can never have enough blank disks. Some of the more famous Sod's Law of disks state:

1. You are always one disk short at any one time.
2. If you do only have one disk left, it will be faulty.
3. When formatting a disk, it will only fail at the last possible moment.

And so on. Get out there, buy the best branded disks you can and REMEMBER TO WRITE ON THE LABELS!

Mouse mat

Magazines are too slippy, trousers are too fluffy and the cat won't stay still long enough. You need a mouse mat. For some reason, 90% of mouse mats are blue. If you spend more than £5 on one, you are a very silly individual. FutureTech do one at £3.50, which is close to the limit. You can even get official CU AMIGA mouse mats, for the more discerning. What better present for a birthday, what better expression of sentiment, what greater testament to friendship (and more shameless plugging)...

Dust cover

As an unfeasible percentage of household dust is composed of human skin, don't you think a dust cover is a good idea? Unless you want your mother to vacuum up the keys off your keyboard, I'd recommend one. If you are a person with strange tastes, you can buy a device called a Seal'n'Type which encases your keyboard in a thin film of plastic.

Control Centres

A control centre is the computer equivalent of the extra skirting people buy for their Ford Escorts to make them look fast and sleek like Rally cars. If you have a Ford Escort, Captain Diamond can make your day for only £35. He claims it will transform your Amiga into "the ultimate hi-tech integrated workstation environment", and who am I to argue?

Books

No matter how much you think you know, someone will always write a book to tell you otherwise. The Amiga has a large number of books written for it, some by people who, believe me, know less than you do. The manuals which come with all new Amigas are particularly well written, and it's only when you get into slightly more specialist areas such as programming that books are worth worrying about.

The exception to this rule is probably AmigaDOS, the name given to the various commands you can type into the Shell. The best books in this area are published by Bruce Smith Books, and given such snappy titles as 'Mastering AmigaDOS volume 1' and 'Mastering AmigaDOS volume 2'.

INPUT DEVICES

Getting information into the computer has to be as easy as possible. Here we look at ways of improving the situation.

Joystick

If you want to play games, a joystick is a mus – a fact which is so taken for granted that it sometimes doesn't appear on the game's box! Playing a game with a mouse can be too frustrating to be worthwhile.

The range of joysticks for the Amiga is staggering – you can even buy them in the shape of Bart Simpson if you really want to. So much is down to personal choice that you really need to try before you buy. I like the Konix Navigator style, some can't stand it and yearn for something more subtly masculine in appearance. Dynamite Computers have a large range, starting from £3.50 for the classic Quickshot to £20 for a steel shaft Quickjoy Megastar. They'll also supply the Cheetah Characterstick in several different guises for £9.

Mice

The mice supplied with the Amiga don't seem to stand up to well to the test of time. Some people simply don't like them from the offset. Well, it's a free world and replacement mice are easy to come across. Naksha have an excellent reputation, and for £25 FX Direct will send you a replacement rodent.

Trackballs

Just to be different, you might like to consider a trackball instead of a mouse. They plug in to any Amiga in exactly the same way as a mouse, but don't slip and take a lot less space. If you can donate a day or two to getting the hang of them, you might find that you prefer them. Evesham Micros will sell you one for £30.

TECHIEWARE

Now we're talking! If you really want to get into computing with the Amiga, you'll need to add some of these items to your shopping list. And while you're at it, get us some too...

Hard drive

Almost essential for serious and even semi-serious use, a hard drive will radically alter the way you use your Amiga. If you are buying an A600/A1200 make sure you spend extra and get a hard drive.

For the rest of us the choice is bewildering. SCSI or IDE? External or hard card? Through port? Expansion RAM? Built in accelerator? Rated amongst the best for the A500 is the GVP HD+, which is also available in accelerated form. Prices start at about the £300 mark, so shop around from any of the dealers mentioned for the best deal. Back issues of CU Amiga carry reviews of practically all the drives available.

Accelerators

If your new computer isn't fast enough for you, you need an accelerator. They plug in and go, speeding up operations by as much as you are willing to spend. The best budget boards come from SSL, available from many dealers. Prices are as low as 150, so keep a look out.

Emulators

So you've bought an Amiga, but realised what you really wanted was a PC. You're in luck, for you have several ways of getting that all-important user-unfriendliness up and running on the Amiga. KCS and Vortex both produce boards which slot in to various places, and can run any PC software you want.

Modems

The best way to get information. Starting at £70, a modem will connect you to the rest of the World. Free software, friendly chats and hot gossip are all available from your local bulletin board. Check out the regular Comms column in CU Amiga every month.

Printers

By adding a cheap 9-pin printer to your computer, you have made it more useful by a factor of at least 100%. Now you can word process, and throw that bottle of correction fluid away. Silica Systems sell printers starting at a little over £100. Think seriously about getting one – you won't regret it.

VIDEO

The quality of the Amiga's graphics has always been its trump card. Ideal for anything from 3D Image rendering to home video titling, every Amiga has amazing possibilities.

Monitor

A dedicated monitor makes so much difference to an Amiga that some say they should be compulsory. Suddenly text is rock-steady and clear, colours are bright and there are no longer any fights when Home and Away comes on.

The standard monitor is the Philips 8833, which also appears under various other guises.

It is perfect for everything from games playing to word processing, and costs less than £200. If you value your eyesight and want to restore calm to family life, consider telephoning an order to Silica Systems.

Genlock

You can buy a Genlock for as little as £65 from Gordon Harwood Computers, and here's why. Recording titles onto video tape is all very well, but overlaying them on live footage is something else.

Now you can subtitle drunk relatives speeches at weddings, draw false beards on newsreaders and perhaps even make some extra pocket money producing semi-professional videos.

Video digitisers/Image scanners

Capturing images from external sources opens up all sorts of possibilities. With Rombo's VIDI12 (available from HB Marketing) you can grab full-colour images from video and then load them into *Deluxe Paint* for butchering. A hand scanner from Hobbyte will grab your pictures in a format ideal for Desktop Publishing. You're looking good!

SOUND

The Amiga supplies four channels of 8-bit sampled sound as standard, which until fairly recently was considered the bee's knees. These days the public demands a little bit more, and as ever, we deliver.

Sound samplers

In order to capture your own sounds, you will need a sampler. Prices for samplers vary according to features, but the GVP Sound Sampler at £50 from Silica Systems is rated very highly. Cheaper mono samplers are available, and nearly all come complete with the software needed to drive them.

Sound enhancers

When sounds are played back by the Amiga hardware, they must first pass through some electronic filters to try and improve the quality. The simple filter built into the Amiga can be improved upon, and two such devices are available. They are the Omega Projects sound booster (from Special Reserve) and the Pyramid sound enhancer (from Genloc Ltd.).

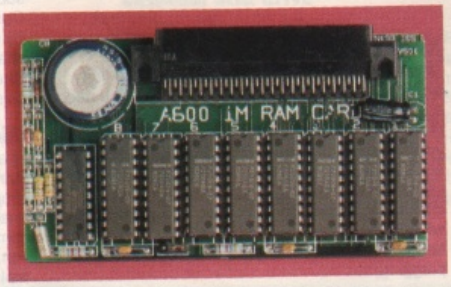
MIDI interface & software

A design flaw on behalf of Commodore means that the standard Amiga does not come with a MIDI interface as standard. For £20, MJC Computer Supplies can rectify this fault, with an excellent little unit which plugs into the serial port. With a copy of a sequencing program, for example the quirky but excellent *Music-X*, you can compose your own tunes with the aid of musical instruments ranging from the cheapest of compatible home keyboards to the most expensive of professional synthesisers. Recommended.

Memory expansion

If you have a A500 or A600, you're in luck as giving your system a quick memory boost is cheap, quick and almost impossible to do wrong. Adding an extra 512K or 1Mb is the surest way to cut down on those nasty 'Software Failure' messages which seem to crop up at the most inconvenient times.

Shop around before you buy, but Reflex will update your A500 to 1Mb for £15, Phoenix will give your A500+ a total of 2Mb for £35, and for £33 Futuretech will populate your A600 to 2Mb. Memory has never been so cheap!



If you want more memory than this (greedy!), you'll need to explore other avenues. A600 owners will need to make use of that credit card slot on the side of their machines, A500 owners will need a box of tricks to plop onto the side. Prices are higher here, so keep a regular check on the advertisements in CU Amiga. As an example, Evesham Micros will provide A500 owners with 4Mb of extra RAM (expandable to 8Mb) for £160.

Owners of the shiny new A1200 can use their credit card slot, or more sensibly will wait for a week or two as the manufactures race to discover what exactly can be done with the various interfaces.

Owners of the 'big box' machines (A1500/2000/3000/4000) have many third party cards available, and companies such as Reflex can offer advice on how to spend your money.

That brings us to the end of the essential upgrades, what follows are the optional extras which tailors your machine to your exact needs. We can't mention everything is this small space, so make sure you keep reading the reviews in CU Amiga every month for the latest news.

Contacts

First Computer Centre 0532 319444
Reflex 051 708 5588
Phoenix 0532 311932
Futuretech 0908 211665
Diamond 071 580 4259
Bruce Smith Books 0923 894355
Dynamite Computers 0234 214212
FX Direct 0296 688222
Evesham Micros 0386 765500
Special Reserve 0279 600204
Genloc Ltd. 0257 472887
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Silica Systems are pleased to present the GVP range of peripherals. GVP are the world's largest third party manufacturer of peripherals for the Amiga range and have a reputation for high specification, quality products. The company was founded only four years ago by a man who knows about the Amiga, Commodore's ex-Vice President of Technology. He, along with a team of Amiga experts including other ex-Commodore staff, understand the add-on requirements of Amiga owners better than anyone. Not only do GVP provide peripherals that Amiga owners want, they also offer peace of mind, with a 2 year warranty on the products they manufacture. So, if you are looking for the very best in peripherals for your Amiga computer, look no further than GVP.

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GVP's HD8+ hard drive and A530 hard drive with 40MHz accelerator, represent the highest quality Amiga 500 peripherals, at very affordable prices. Each incorporates a fast action hard drive, RAM expansion capability, custom VLSI chip and FaaaSTROM SCSI driver, for unbeatable performance.

The HD8+ hard drive offers up to 8Mb of standard internal Fast RAM expansion and the A530 Combo, up to 8Mb of 32-bit wide fast RAM expansion. Both feature a SCSI controller, which supports up to 6 additional devices, and an Autoboot/Game cut-off switch. Both are available in 80, 120 and 213Mb hard drive versions.

In addition, the A530 Combo zooms the Amiga forward with an 030 accelerator, running at a blistering 40MHz. This enables your Amiga 500 to run at an incredible 12.1 MIPS, faster than an Amiga 3000! No other product in the world combines all the features found in the A530 Combo! A plug-in PC emulator option, shown below, is available for the HD8+ and A530 Combo.

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A530

	HD8+	A530
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SCSI HARD DRIVE 40, 80, 120 & 213Mb VERSIONS	●	●
ULTRA FAST ACCESS	●	●
TRANSFER RATE UP TO 2,100K/sec* (*THE RATE OF THE 213Mb HD)	●	●
ACCELERATOR		
40MHz 68030EC CPU		●
OPTIONAL 68882 MATHS CO-PROCESSOR		●
RUNS AT 12.1 MIPS (FASTER THAN AN A3000!)		●
HARDWARE SUPPORT TO MAP KICKSTART INTO 32-bit WIDE FAST RAM FOR FASTER OPERATION (LIKE CACHING THE OPERATING SYSTEM)		●
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UP TO 8MB OF 8 OR 9-bit FAST RAM (8 OR 9-bit WIDE SIMMS - 120ns OR QUICKER)	●	
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PC EMULATOR
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- 16MHz 80286 processor
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This powerful 286 emulator module simply plugs into the "mini-slot" of the GVP HD8+ or A530 (without invalidating the warranty). It has full access to the Amiga's resources and allows you to run PC and Amiga programs at the same time, giving you two computers in one.

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FOR ALL AMIGAS

SOUND SAMPLER

- 8-bit stereo sampler
- Plugs into parallel port
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The semi-professional and audio hobbyist a high quality 8-bit stereo sound sampler that connects into the parallel port on any Amiga 500, 600, 1500, 2000 or 3000 computer. Combined with one of the latest, most powerful and easy-to-use sound and music editing programs available. Includes 4-track soundtracker file compatible sequencer.

MUS 2500 **£49.95**

NEW!

VIDEO GENLOCK

- 2x Composite Video, 1x S-VHS inputs
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- Sound mixer, 2 mono inputs and 1 output
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GVP's G-lock genlock is a true price/performance breakthrough. The G-lock genlock works with all Amiga computers and even supports the new Chroma Key modes of the ECS/AA chip set. It is the only choice for the mid-range Amiga video enthusiast.

VID 2500 **£349**

AMIGA 1500 + 2000 + 3000 PRODUCTS

ACCELERATORS

	030 25Mhz	030 40Mhz	030 50Mhz	NEW! 040 33Mhz
Processor	68030EC	68030EC	68030	68040
Speed MIPS	7.48	12.1	15	30
Speed MHz	25	40	50	33
Math co-proc	68882	68882	68882	Built-in
Standard 32-bit RAM	1mb	4mb	4mb	4mb
Maximum 32-bit RAM	13mb	16mb	16mb	16mb
Extras	SCSI	SCSI	SCSI	SCSI Ser/Par
Code	UPG 0118	UPG 0430	UPG 0533	UPG 0740
PRICE	£599	£849	£1199	£1499

All GVP G-Force accelerators can be turned into a hard card by adding a Mount Kit, GVA 4251, £39.95, making it the ULTIMATE Amiga 1500/2000 peripheral. Any 1" SCSI drive can then be mounted on to the accelerator.

HARD CARDS

- Factory installed Hard Drives
- 0, 80, 120, 213, & 420Mb options
- On-board 8Mb memory sockets
- Add up to 6 SCSI devices

The Impact II HC8 hard cards are the equivalent of the HD8+ hard drive, but for the 1500 and 2000 models. They are some of the fastest hard drives available, and incorporate an unpopulated 8Mb RAM expansion.

0Mb	Ref: HAR 1300	£129
120Mb	Ref: HAR 1422	£449
213Mb	Ref: HAR 1533	£699

VIDEO ENHANCER

- 16 million colours @ 768 x 580 PAL Res
- Supports comp video, S-VHS & RGB
- Broadcast quality genlock
- Now with RGB splitter

Impact Vision 24 is the latest 24-bit Professional Video Adaptor. It features 16 million colours on screen at once, built-in genlock, flicker fixer, frame buffer, frame grabber and digital keyer. Supplied with Caligari-IV24 3D modelling and rendering software, Scala IV24 video titling software, plus Macro Paint 24-bit paint package. A1500/2000 requires additional adaptor, GVA 5224, £49.95.

IV-24 - VIU SPLITTER Ref: VID 7024 **£1499**
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RAM BOARDS

- Up to 8Mb of FAST RAM
- Upgrade in 2Mb increments
- Supports industry standard RAM chips
- Diagnostic software included
- Fully auto-configuring

The RAM-8 offers an easy way to upgrade your 1500 or 2000 in 2Mb increments up to 8Mb. The RAM 8 is fully auto-configuring and is supplied with peace-of-mind diagnostic software. 6Mb configuration supported for bridgeboard owners

0Mb populated RAM 2800 **£99**
2Mb populated RAM 2802 **£149**

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Before you decide when to buy your new Amiga products, we suggest you think very carefully about WHERE you buy them. Consider what it will be like a few months after you have made your purchase, when you may require additional peripherals and software, or help and advice. And, will the company you buy from contact you with details of new products? At Silica Systems, we ensure that you will have nothing to worry about. We have been established for almost 14 years and, with our unrivalled experience and expertise, we can now claim to meet our customers' requirements with an understanding which is second to none. But don't just take our word for it. Complete and return the coupon now for our latest FREE literature and begin to experience the "Silica Systems Service".

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LONDON SHOP:	Selfridges (1st Floor), Oxford Street, London, W1A 1AB Opening Hours: Mon-Fri 9.30am-7.00pm (Sat close 6.30pm) Late Night: Thursday - 8pm	Tel: 071-629 1234 Extension: 3914
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ESSEX SHOP:	Keddies (2nd Floor), High Street, Southend-on-Sea, Essex, SS1 1LA Opening Hours: Mon-Fri 9.30am-5.30pm (Sat 9.00am-6.00pm) No Late Night Opening	Tel: 0702 462426 Fax No: 0702 462363

To: Silica Systems, CMUSR-0193-68, 1-4 The Mews, Hatherley Rd, Sidcup, Kent, DA14 4DX

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Mr/Mrs/Miss/Ms: ..... Initials: ..... Surname: .....

Company Name (if applicable): .....

Address: .....

.....

..... Postcode: .....

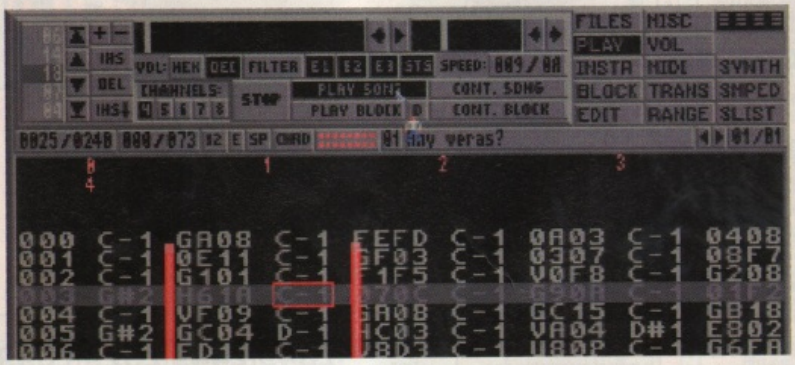
Tel (Home): ..... Tel (Work): .....

Which computer(s), if any, do you own? 68G

E&OE - Advertised prices and specifications may change - Please return the coupon for the latest information.

QUESTIONS & ANSWERS

Not everything goes according to plan. Not everything is right first time, every time. But fear not. Even the most magnificent of experts had to start somewhere, and how well we remember those first setbacks. Therefore we have cunningly compiled an extensive list of some common problems and their oh-so-obvious solutions.



Disks drives

Q. The disk drive doesn't seem to work properly. What's up?

A. Occasionally the square plug from the power supply doesn't fit into the socket on the Amiga as snugly as it should. This can stop the internal disk drive from receiving power. Push it firmly home.

Q. Why won't my hard drive auto boot.

A. Most hard drives will give priority to floppy drives. Check to see there isn't a disk in one of your external drives.

Q. My floppy disks become corrupt quite often.

A. Look carefully at the way you treat the disks. Do you pile them on or near sources of strong magnetic fields such as loud speakers, televisions or power supplies? Do you store them in dust free environments? Do you smoke whilst using your computer? Particles of cigarette ash can damage the surfaces. Ensure that you always wait for the drive light to go out before removing disks from the computer.

Q. What does 'Write Protected' mean?

A. Floppy disks have small tabs in the corner. When in the open position (i.e. you can see through them), it is impossible for the Amiga to store information on them: they are Write Protected.

Q. There isn't room on my disks to store enough information!

A. You can 'archive' files to save space. If you don't need immediate access to them, for example the files are old documents or pictures, use a program such as LHA, ARC or ZOO to squash them in size. If you want to squeeze programs – such as *Deluxe Paint* – a program such as *PowerPacker* is better, as it automatically uncompresses programs. Ask your PD library for more details.

Miscellaneous

Q. Why does my mouse keep slipping?

A. It's ball is dirty. All mice can have their ball removed for cleaning. While you have it apart, check the roller mechanisms for fluff. If necessary, disconnect the mouse from the computer and remove the fluff with a darning needle or hat pin.

Q. When someone switches the kettle on in the kitchen, my Amiga crashes.

A. You need a 'surge protector'. You can buy them as single plugs, or built in to a 4-way gang. Think about getting one anyway, and then you can switch on your computer, monitor and printer all at once.

Q. My disk drive remains on, even after a program has loaded.

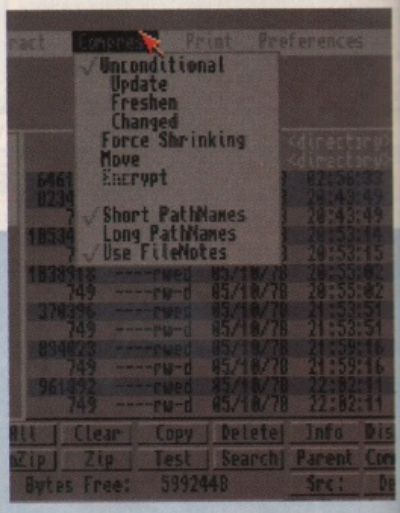
A. Sounds like one of the internal chips – a CIA chip to be exact – has broken. This is a common complaint, especially amongst those who like to connect and disconnect peripherals to the serial and parallel ports without switching the Amiga off first.

Q. Something strange seems to be happening... Help!!!

A. Stop holding your breath for so long, it's bad for you. Alternatively, it could be that your system has become infected with a virus. One of the dangers of using pirated games is catching a virus. (Another is being caught, and having to pay a fine.) Get hold of the latest version of an anti-virus program such as 'Virus Checker' from a PD library, and check all your disks. The best way to avoid viruses is never to use any software that you can't trace directly back to source.

Q.. How can I run CP/M on my Amiga?

A. Go away Jeff, it isn't funny any more.



?Q&A??

Video

Q. When using the TV modulator, I can't get any sound out of my TV.

A. There is a small switch on the modulator, used to determine where in relation to the video signal the audio component is placed. If after switching it to its alternative position you still can't here anything, you should check the following: Is the television sound turned up? Are the leads from the Amiga to the modulator inserted correctly? Does mistunning the television slightly help?

Q. When I select Interlace mode from the Workbench Prefs or *DPaint*, the screen flickers.

A. It sure does. Unfortunately that's the way Interlace works. The only way around this problem is to buy a special card called a flicker-fixer, and a dedicated monitor (SVGA or Multiscan). The new Amigas (A3000, A1200, A4000) have integral flicker-fixers, but still need the expensive monitors. The flicker is not so noticeable if you video-tape the signal and play it back, but for most applications this is not a feasible solution. It's a trade off – you either get higher resolution and flicker, or lower resolution and no flicker.

Q. How can I improve the quality of the picture on my television screen?

A. The best way is to sell the television and buy a monitor, which has the added benefit of not being able to display Australian soaps. If this isn't possible, try the following.

- **If your TV has a SCART (Peritel) socket, buy a lead which will use the pure RGB from the Amiga instead of using the modulator. The picture will be much, much clearer.**
- **Use high quality leads. Don't try to use cheap twisted pair speaker cable to extend the video signal. Keep the leads as short as possible.**
- **Keep the leads connecting the Amiga to the TV away from the power supply and any other mains cables. Power supplies generate interference.**
- **If you have many external devices, try disconnecting them one at a time. Switch the computer off before removing them! If the picture improves it could be due to one or both of the following reasons: they are using too much power from the Amiga (get separate power supplies for the peripherals), or the peripherals themselves are generating interference.**

Workbench

Q. What are 'hotkeys' and how do I use them?

A. Hotkeys are shortcuts that save you having to select options from a menu. For example, the Workbench menu option Backdrop has a hotkey equivalent 'B'. The strange A symbol in front of the B indicates that you should hold down the left 'Amiga key' and whilst holding it down, press B. The Amiga key is the key immediately to the left of the space bar. The Backdrop option toggles the Workbench from being on a Window to being on a Screen – choose the one that you prefer.

Q. When I do a DIR at a Shell window, I've noticed a lot of files which end in '.info'. What are they for?

A. Every file which has an associated icon, has a second file of the same name, but with the .info extension. If you were to delete the .info file, the icon would vanish. Some files, for example, the C directory and its contents, don't have associated icons and so don't have any .info files. If you really want to see them in Icon form, select Show All Files from the Workbench's Window menu.

Q. How can I get more memory for my application programs?

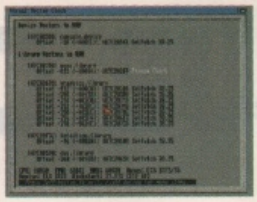
A. If the application program is running on another screen, try to select an option from one of its menus which is called something like "Close Workbench". Don't worry – it will be opened again if you leave the program. If you can't close it, use the Workbench Prefs program to alter the Workbench display to be a 200 line, 2 colour screen. This will save a sizable amount of Chip ram, and also speed up Window and Icon operations.

Q. When I try to re-define the Workbench screen, it keeps telling me to 'close windows and retry'. Why?

A. Any program which needs to access the main Workbench screen must be stopped before the screen can be re-drawn in its new size, resolution or colour scheme. This is because altering the screen alters data structures used by the application programs. If the data structures were changed without telling the programs, Woof! Instant crash. That's why you need to shut down every running program first. You need to close any Shells because they have processes running themselves. Programs running on their own screens don't need to be shut down

Q. I spend an hour tidying up the Workbench, putting all the icons were I want them. When I switch the computer on the next day, they have all moved back to where they were – why?

A. The icons and windows will only remember their positions if you use the 'Snapshot' option from the Workbench menu. Select all the items you want to snapshot – using the extended select



trick of holding down the shift key if necessary – and then select Snapshot from the Icons menu.

Q. My Amiga doesn't know the time. The clock option is always wrong.

A. Some Amigas don't have internal clocks. If yours is one of these, you can add one by buying a memory expansion card with a clock option. Once they are set, they will continue to remember the time for years.

Q. I have an A500Plus/A600 and some budget games won't run.

A. This is because the programmers broke some of the programming rules. Some older games, which are typically several years old, were written before the new Amigas existed. You can try taking them back to the shop and claim a refund by bluffing about 'Trade Descriptions'.

Sound

Q. How do I improve the quality of the sound?

A. Don't put it through the television. Use standard phono leads to connect the Amiga to a hi-fi amplifier. If you don't have a nearby hi-fi, think about buying a dedicated Amiga amp and speakers. The improvement over TV sound is amazing.

Q. How do I make my own sounds for use in programs such as OctaMED?

A. You'll need to buy a sound sampler, which will allow the Amiga to digitally record sounds for your own use.

Q. Why does the power light sometimes change brightness?

A. When the power light goes dim, a program has switched off the internal audio filter. Depending on the type of sound, the filter can actually reduce playback quality.

WE'RE HERE TO HELP

There are always some things that will confuse or elude you, and that's where we can help. Just drop us a line at Q&A at the usual CU address and our experts will answer whatever you throw at them.

????Q&A??

CLUB CALL

You can do it all on your own if you're a real hard case, but calling on the support of other Amiga owners in your area has distinct advantages. Lending a helping hand to Amiga users everywhere, CU is happy to support established computer clubs using our favourite family of machines. If your club wants to spread the word about its activities, feel free to drop us a line.

CDTV USERS ASSOCIATION

113 Fouracres Road,
Newall Green,
Manchester M23 8ES.

A year old this January, the club has grown from the two friends who founded it into an organisation with more than one hundred members. It's still growing, and membership remains free (although a regular supply of stamped addressed envelopes is required).

The club has set itself several aims which will, no doubt, attract the sympathy of fellow CDTV users. It intends to:

- Supply the technical support which seems to be lacking at present.
- Encourage software houses to label Amiga titles with regard to CDTV compatibility.
- Compile a list of compatible and incompatible software.
- Promote the potential of the format to software houses and prospective customers.
- Encourage software houses to keep the price of CDs reasonable and make new products CDTV compatible.
- Provide a regular newsletter with the latest CD news, reviews, users' letters and competitions.

The chairman, Julian T. Lavanini, is also looking into the possibility of hiring CDs (due to their non-copyable nature), and selling CD hardware and software. If you want more info, Julian's the man to write to.

GLASGOW SENSIBLE SOCCER CLUB

28 Stamperland Hill,
Clarkston,
Glasgow G76 8AF.

Briefly known as the Glasgow Sports League during its formative stages, this club for devotees of Renegade's famous footy game is putting together a growing squad. With ten members already signed and a further ten prospective candidates in receipt of their application forms, team-building is proceeding apace.

A newsletter for members, 'Glasgow Sensibles', is now being published and should feature results and match reports. If you can't think of a better way to enjoy your Amiga than chasing a few pixels up and down a pitch, why not write and get details of the next match.

UK CLUB

COMMODORE PRODUCTS USERS GROUP

P.O. Box 1309,
London, N3 2UT.
Tel: 081-346 0050

In existence for 14 years, the ICPUG is a well-established organisation whose most visible presence is its well-produced newsletter. With almost 100 pages per issue, the bi-monthly magazines provide information on the C64 and PCs as well as the Amiga. Features on CDTV and heartrending articles such as 'The Day my Hard Disk Crashed', extensive coverage of programming and applications, reviews of hard and software, news, and readers' letters are all included.

Though not a club in the way that most groups featured on these pages are, many of ICPUG's widespread members have formed local clubs which meet and discuss their computers in the usual fashion. An extensive PD library is available to members, numbering 1,100 disks for the Amiga alone.

A special end of year subscription offer may still be snapped-up if you,re quick: the September/October issue (containing the articles mentioned above) and the November/December edition are available for £7. A full year's membership (including subscription to the newsletter), to begin in 1993, will cost £21 for UK residents, £25 for those of you elsewhere in Europe, and £35 for anyone outside Europe. All enquiries regarding membership of ICPUG should be directed to the Membership Secretary, Jack Cohen, at the above address.

AMIGA USER'S GROUP (FYLDE)

25 Glen Eldon Road,
Lytham St Annes
Lancashire FY8 2AX.

Here is a Lancastrian club which certainly believes in keeping in touch with its membership. Firstly, it compiles NewsDisk, a monthly on-disk magazine containing articles by members, hardware and software reviews, programming tips, PD programs, listings of second-hand goods for sale, and (surprise, surprise) news about forthcoming meetings and Amiga-related events. Secondly, it provides a telephone advice line aiming to solve equipment and software problems.

Membership, including a subscription to the NewsDisk, is available for £15 a year (£8.50 for six months), which goes towards covering the costs of this non-profit-making club. Members with modems can also access the Red Rose Bulletin Board, based in Preston, for an extra £7.50 a year. For a membership application form and further details contact Andy Wilkinson at the above address.

AMIGA 500+ CLUB

3 Islay Court,
Irvine,
Ayrshire KA11 4JQ.

Clearly committed to providing its members with access to the sort of hardware and software they might not otherwise be able to use, the Amiga 500+ Club has recently purchased a real time frame grabber to complement its colour video camera. The range of facilities now available includes assistance in getting both colour IFF and HAM files for use with DTP programs, and the conversion of slides, negatives, photographs, video and cine film. These services are free to members, who only have to pay for a disk and postage. Completely free off-line printing will also be provided following the purchase of an H.P. IIIP laser printer. Furthermore, the club plans a bulletin board for the near future.

THE GURU MASTERS

111 Sherborne Road,
Bushbury,
Wolverhampton WV10 9EU.

An unusually-named club which is actually a demo group producing utility and demo compilations, digitised slideshows, sampled songs and remixes (they are currently working with some songs by a group called Purple Mouse, which I am assured are very funny). In existence for two years, and with a membership of twenty, The Guru Masters are working towards full coding of demos and would particularly welcome new members with knowledge of this field, and of music and graphics. Enquiries should be directed to 'The Sheriff' at the above address.

AMOS PROGRAMMERS CLUB

6 Brassey Avenue,
Broadstairs,
Thanet,
Kent CT10 2DS.

A recently-established club which, as its name suggests, hopes to assist people learning the AMOS programming language, and provide a forum in which AMOS users may swap ideas. The club organiser compiles a disk magazine for members that includes example programs, samples and, naturally, help with AMOS. Future plans include the establishment of a free PD network to allow members to exchange programs. Details from the above address.

The club is very well supported by well known programmers who regularly creat demos and tutorials.

COMMODORE AMIGA USERS GROUP

85 Highfields Road,
Witham,
Essex CM8 1LW.

Although this club is interested in more than gaming, it started just over a year ago when a group of friends gathered to run competitions on Kick Off II and Stunt Car Racer. Hundreds of cheats are currently being compiled by the club and put on disk, making just the sort of reference material keen gamers are eager to get hold of. The thirty members also share PD programs and magazines, and an on-disk newsletter is being established for them.

THE KENT YOUTH COMPUTER GROUP

The North Youth Centre,
Essellar Road,
Ashford, Kent..

In September this club moved its meeting place to a purpose-built computer room at the above address. Meetings take place on Tuesdays and Thursdays, between 6.30pm and 9.30pm, with a 50p entry fee (40p to existing youth club members. Other computers are covered besides the Amiga.

PERTH AND DISTRICT AMATEUR COMPUTER SOCIETY

14 Imrie Place
Hillyland
Perth PH1 2QN

Covering the Perth (that's Perth, Tayside by the way, not Perth Australia) region, this club meets every month to discuss all things computer related, including all types of Amiga.

Talks are given on a range of subjects interesting to Amiga users, such as the pros and cons of buying a CDTV, animation, MIDI, programming and info on the best peripherals to buy.

There are regular workshops and demonstrations of all kinds. Members are free to use the clubs rather extensive PD library for immediate access to programs covering a whole range of applications.

A bulletin board is being established so members can access all the hints, tips and software of the club without ever having to leave the comfort of their own computer.

Membership costs, at the moment , £6 per annum . If you live in the Perth area it may be well worth your while going along one evening as a guest to try out the club before you join.

Send an SAE to the above address for furthe details and dates of when the club meets.

ROUND UP

GLOSSARY

There are quite a few things that may be a little confusing at first. Probably the most mystifying is why everyone seems to be speaking an entirely different language when it comes to computers. To help you here is a brief list of the important terms you may come across in this magazine and elsewhere.

Accelerator This is a hardware device which enables your machine to run faster. They are very useful if you run a lot of programs which require heavy processor time, such as graphics work, DTP and raytracing.

Active A window is said to be active if it is the currently selected task. You can make a task active by clicking on its window with the mouse button.

AmigaDOS The disk operating system of the Amiga. The DOS provides the basic functions necessary for the computer to work.

Application The name given to a program which is used for a specific task. Applications include software like Art packages, Word processors etc.

Archive An archive is a way of storing information which is not needed immediately in a space efficient manner. Archived files take up much less room, but they must be unarchived again before use. Popular archivers on the Amiga include LHA, LHArc, Zip and Zoo.

Argument This is a parameter passed to a program to give it further information about its task. For example 'LHA x plop' tells the LHA program to extract files from the archive called 'plop'. See also editorial discussion.

ASCII The standard format for text storage on any computer. ASCII text is almost universally transferable between machines and applications on any system.

Backup A security copy of information, cunningly made in case of any accidents with the original.

Bitplane A block of memory containing one bit of information for a graphics screen. See page 16.

Boot To start up the machine from scratch, 'booting' from the software currently in the disk drive.

Bootable A disk which the machine is able to boot up from is said to be bootable. To do this the disk must have been 'installed' or copied from a bootable disk.

Buffer A temporary storage area in memory, used to speed up operations.

Bug A mistake in either software or hardware which causes programs to malfunction.

Close Gadget A small box which may be present in the upper left of a window. Clicking on it closes the window.

Chip RAM Also called Graphics memory, this is the area of the computer's memory which can be directly accessed by the custom chips.

Coprocessor Effectively an extra brain for the computer, the Coprocessor is usually designed for a specific task, e.g. a maths coprocessor, which speeds up floating point calculations.

Dithering This is the name given to the technique in graphic displays of creating smooth transition phases between two colours by alternating them to varying degrees in the spaces in between.

Drawer The name given to subdirectories on Amiga disks.

ECS The Enhanced Chip Set. The redesigned custom chips of the Amiga, present in the A500+ and A600.

Execute To carry out instructions in a CLI, program or script file.

Extended selection The process of selecting more than one file at once, achieved by holding down shift whilst making multiple selections with the mouse. All files chosen should remain highlighted.

Fast RAM Any memory accessed by the Amiga which is not Chip RAM.

File A collection of data stored in an organised fashion on a disk or in RAM

Font The name given to a character set or typeface used by the Amiga. All the available fonts are to be found in the 'Fonts:' directory.

Format To prepare a disk for use by the computer. Organisational data is recorded onto the disk so that it can be recognised by AmigaDOS

Gadget An area of the screen which will initiate some command or function when clicked with the mouse.

Genlock A device which enables the user to overlay Amiga graphics onto a video image from another source.

GUI Graphical User Interface, an alternative name for a WIMP system. See page 8.

HAM Hold and Modify. A graphics mode used by the Amiga to display 4096 colours. See page 18.

Hard disk This is a device in which data is stored in a similar way as it is on floppies. A hard disk uses a rigid platter and is often a collection of disks on the same spindle. They generally hold far more data than a floppy disk and are much faster.

Hot key The name given to a keyboard shortcut in an application to initiate a desired function. These are usually a combination of keys such as Amiga-Q for quit, etc.

Interlace A screen mode used by the Amiga which doubles its vertical resolution. Unfortunately it is not possible to view this mode without excessive flickering, unless you own a special monitor or a flicker-fixer hardware device.

Kickstart This is the name given to the Amiga's ROM which contains part of the operating system.

Library A set of functions stored in a file which may be accessed by other programs.

Menu A list of on-screen options which drop from the top of the screen when the right mouse button is pressed on the title bar.

Menu item An option that appears on a menu list.

Monitor A dedicated computer display device.

Multi-tasking The ability to perform more than one operation at the same time. The Amiga has a true multi-tasking operating system.

Overscan A technique whereby the screen resolution is increased to take better advantage of the width of the video signal.

Parallel An interface port which is normally used by any printer or sampler you may have connected.

Partition An area of space on a hard disk. They are often broken up into partitions, which act as separate devices, in the interests of speed and security.

Peripheral An external piece of hardware which is used with the computer.

Pointer The graphic image which acts as a cursor on the Workbench screen.

Preferences The name given to a collection of programs on the Amiga which allow you to alter the Workbench environment to suit your needs.

Qualifier A key which is pressed in conjunction with another to denote a special action. Common qualifiers used are the Amiga keys, shift, Ctrl and Alt.

RAM The memory of the computer into which programs and data are loaded for execution or processing. RAM is volatile and all the contents will be lost when the machine is turned off.

RGB Red Green Blue. This is a type of video signal which allows exceptionally clear displays. The Amiga provides an RGB signal from its video port.

ROM A memory store just like RAM except the contents are permanent and will remain in ROM even when no power is supplied. ROMs are generally used for storing a computer's operating system.

Root Block The area of a disk which contains important directory information.

Reboot To restart the computer, either by turning it off and then on again, or by using the reset key combination of Ctrl and both Amiga keys.

Script A file containing a list of commands in ASCII format. This may be executed as a program by AmigaDOS

Serial An interface which is commonly used for communications devices such as modems or network cards.

Snapshot A method of preserving the position of an icon.

Toggle An option which can be switched between two states, usually on and off.

Trashcan A special directory on a disk into which unwanted items are placed. They are permanently removed only when the trash is emptied, using the appropriate selection from the Workbench menus.

Volume An alternative term used to describe a floppy disk or hard disk partition.

Window A rectangular screen area which can accept or display information. Windows can often be moved, pushed to the front or back of the screen and resized.

Workbench The name given to the WIMP operating system used by the Amiga.

Xylophone An annoying musical instrument which, thankfully, has nothing to do with the Amiga.

Yorkie A chocolate bar particularly enjoyed by men operating industrial machinery. See above.

Zoom gadget A gadget which may appear in the upper right of a window, allowing it to swap between two sizes.

RICOH PCL5 LASER PRINTER

Ricoh UK Ltd is part of the worldwide Ricoh Group of companies, originally established in Japan, in 1936. With a turnover of over $5 billion and 37,000 employees, Ricoh have been producing computers and peripherals since 1971 and are the world's second largest manufacturer of Laser Printer engines. Ricoh have employed their expertise to produce a 'first' in laser printers for the world market, the LP1200 with FLASH ROM.

Fully HP LaserJet III™ compatible, the LP1200 employs industry proven laser technology. Unlike LED page printers, which use light emitting diodes, the LP1200's laser lightsource, focussed by high quality lenses, is able to produce the most accurate and intense printed images. Its fast, efficient processor and engine, together with a straight paper path design, allows printing at a full 6 pages per minute. Unlike its competitors, the LP1200 can print an A4 page of graphics at 300dpi with its standard memory. Also, Ricoh's advanced laser engine enables the LP1200 to address a range of print resolutions up to 400dpi. The standard 2Mb of RAM installed allows the LP1200 to print a full A4 page of text using standard internal resident fonts, or an A5 page of graphics, both at 400dpi. A FREE Windows driver supplied enables the Ricoh LP1200 to print a typical page of text at 400dpi from Windows 3 using the controller firmware currently installed on the printer and standard internal resident fonts. A 2Mb RAM upgrade (total 4Mb RAM) is required to print an A4 page of graphics.

Again, unlike the competition, the LP1200 includes a powerful document description language as standard. This language, 'LAYOUT', offers unique opportunities to develop custom-made printing systems. Forms and document templates can be designed and stored electronically in the LP1200's FLASH ROM, alleviating the need for pre-printed forms!

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RICOH LP1200

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- **SHARP EDGED PRINTING** *Ricoh FIAL (Fine Image ALgorithm) enhances resolution*
- **400dpi RESOLUTION** *(Default res. - 300dpi. Will address 200, 240 & 400dpi.)*
- **2Mb RAM AS STANDARD**
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FREE! WINDOWS DRIVER

The Ricoh LP1200 is a genuine laser printer and not an LED printer. Make sure you check out the competition!

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Silica Systems are pleased to introduce the revolutionary Ricoh LP1200. It has all of the specifications that you would expect to see in today's most technically advanced laser printers, plus a unique additional feature which places it far ahead of the competition - FLASH ROM. This 'Future Proof' technology protects the investment you make when you buy a Ricoh LP1200, as it enables you to keep up to date with new laser firmware developments. FLASH ROM is an area of memory inside the LP1200 which holds the printer's controller instruction firmware. If new firmware is developed, eg an update to the printer's command language, it can be downloaded into this memory. Other manufacturers would require you to buy a new printer! Fonts, macros, graphics and additional emulations can also be stored in FLASH ROM, or on removable, industry standard FLASH ROM IC cards. The new Ricoh LP1200 is the only laser printer to offer this FLASH ROM facility. The LP1200 comes with a 100 sheet A4 paper tray (letter and legal trays also available as extras) and the facility to feed single sheets of paper and card up to 157gsm. An optional extra universal feeder provides the facility to automatically feed up to 150 sheets, from sizes of 98mm x 148mm to 216mm x 356mm in size at weights of up to 158gsm. The universal feeder also feeds up to 15 envelopes, overhead transparencies and labels automatically.

See how the Ricoh LP1200 compares to its Laser Printer Competitors

FEATURES	EPSON EPL4100	HP L/JET IIIP	M'MAN TALLY MT904+	IBM 4029 Model 010	RICOH LP1200
Average Street Price (excl. VAT) (*expected)	£569	£699	£699*	£750	£699
Official RRP (excl. VAT)	£945	£1,179	£1,099	£1,099	£1,195
Maximum resolution in dots per inch	300 x 300	300 x 300	300 x 300	300 x 300	400 x 400
Windows 3 Driver @ 400 dpi	-	-	-	-	YES
Print Speed	6ppm	4ppm	4ppm	5ppm	6ppm
Straight Paper Path	YES	-	-	-	YES
PCL 5 Printer Command Language	-	YES	YES	-	YES
HP-GL/2 Vector Graphics included	-	YES	YES	YES	YES
Resolution Improvement/Enhancement	YES	YES	YES	YES	YES
Standard RAM	0.5Mb	1Mb	1Mb	1Mb	2Mb
Full A4/300 dpi graphics with standard RAM	-	-	-	-	YES
Warm Up Time	<45 secs	<60 secs	60 secs	33 secs	45 secs
First Page of Text Output	<20 secs	<40 secs	34 secs	20 secs	<15 secs
Document Description Language included	-	-	-	-	YES
Flash ROM	-	-	-	-	YES
Upgradable Firmware	-	-	-	-	YES
IC Card Slot	YES	-	-	YES	YES
Scalable Resident Fonts - in HP LJ III Emulation	-	8	8	0	8
Resident Bit-Mapped Fonts	11	14	14	16	14
AGFA Intellifont Scalable Font Technology	-	YES	-	-	YES
HP LaserJet III Emulation Included	-	YES	YES	-	YES
EPSON FX Emulation Included	YES	-	YES	-	YES
IBM ProPrinter Emulation Included	-	-	YES	-	YES
Standard Tray Capacity	100	70	100	200	100
Protective cover on standard tray	YES	-	YES	YES	YES
Cost per copy**	1.65p	2.00p	1.71p	1.64p	1.65p
Min-Max Paper Weight in gsm	60-157	60-105	60-120	60-131	60-157
Able to print on OHP Film	YES	YES	YES	YES	YES
Able to print on card (157gsm - Manual Feed)	YES	-	-	-	YES
Standby -Noise Level	<40dB	31.7dB	<35dB	38 dB	<38dB
Printing -Noise Level	<50dB	43.3dB	<46dB	50 dB	<48dB

**As quoted by manufacturers - 2/4/92

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Consumables + Accessories

CODE	PRODUCT	PRICE Exc VAT
CAB 7500	Cable for PC/ST/Amiga	£8.47
KIT 5200	Laser Starter Kit inc Cable	£12.50
LAA 5238	Universal Feeder (2nd Tray)	£100.00
LAA 5262	2Mb RAM Module	£149.00
LAA 5210	Developer/Toner Cartridge	£65.00
LAA 5225	OPC Cartridge (Drum)	£89.00
LAA 5334	Letter Paper Tray (100 Sheets)	£35.00
LAA 5323	Legal Paper Tray (100 Sheets)	£35.00
LAA 5312	A4 Paper Tray (100 Sheets)	£35.00

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*Note: A4 paper tray is already included in the £699 price. More A4 trays can be purchased to feed different coloured stationery.

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